

SCIENCE-FICTION
INVASION! (See Page 36)

ARTHUR C. CLARKE
Exclusive Interview: Paradise Found!

MAY 1978 #2

FUTURE

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Artist's conception of the Space Shuttle in its 1979-80 launch configuration (pg. 6)



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The Magazine of Science Adventure **FUTURE** MAY 1978 #2

OUTPUT

A Message from the Publisher 4

INPUT

Letters from Readers 5

DATABANK

News Items from the World of the Present 6

COSMOS 954: A Near Space Disaster!

The Truth About the Fallen Russian Satellite and Other
Orbiting Nuclear Weapons Systems 16

ARTHUR C. CLARKE: Paradise Found

Exclusive Interview with the World's #1 SF Author 20

HARDWARE

New Inventions, Devices & Gadgets 27

FUTURE FORUM

Should the Planets be Explored by Robot Probes or
Manned Expeditions? 28

"THE SHAPE OF THINGS TO COME"

Looking Back at H.G. Wells' Monumental Future History 30

IN PRINT

Reviews of New Publications 34

SF GRAPHICS

Science Fiction Invades the World of Advertising 36

VIDEO IMAGES

Science Fiction & Fact on Television 38

CIVILIZATION IN SPACE

Chapter 2: The Cola Wars! 40

THE WET ALIENS

They're Intelligent, They're Benign . . . and They're Here 48

WALT DISNEY'S TRIP TO TOMORROWLAND

Disney's Space Films of the Fifties Led the Way for the
Apollo Program & the Exploration of the Planets 54

THE MANITOU: Body By Burman

A Graphic Look at the Makeup Used in this New Occult Thriller . . . 64

SCIENCE NOTEBOOK

The Search for Intelligent Life in Outer Space 68

THE UFO STORY

An Interview with Dr. Allen J. Hynek 70

TOMORROW

Norman Spinrad's Vision of Our Multi-Media Future 76

PERSPECTIVES

Closing Observations from the Editor 78

Publishers: Norman Jacobs
Kerry O'Quinn

Editor: Howard Zimmerman

Managing Editor: James C. Odell

Senior Writer: Ed Naha

Science Editor: David Hutchison

Associate Editor: Richard Meyers

West Coast Editor: David Houston

Art Director: Howard Cruse

Space Science Advisor: James Oberg

Space Art Advisor: Ron Miller

Science Columnist: Jesco von Puttkamer

Guest Columnist: Norman Spinrad



Business and Editorial Offices:

FUTURE Magazine, Inc.
475 Park Avenue South, 8th Floor Suite
New York, N.Y. 10016

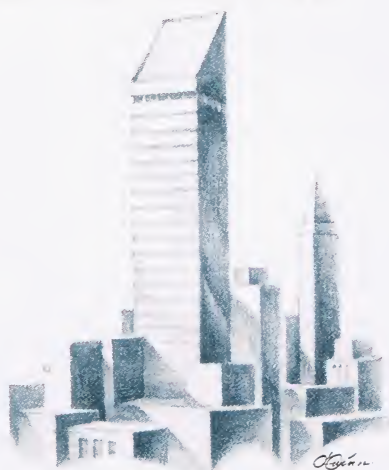
On The Cover: Starting next year, the Space Shuttle fleet will be flying regular orbital missions. During a launch, the shuttle's side rockets fire until exhausted and are then jettisoned—falling back to Earth at a pre-designated spot where they will be picked up, refitted and reused. When the main tank (on the shuttle's belly) is empty, it will either fall back to Earth and break up on re-entry, or be carried to orbit and used in space construction. The first "spaceport" is now under construction at Cape Canaveral to handle shuttle traffic. Until that time, all launches will be from Edwards Air Force Base in California.

Art Staff: Laura O'Brien, Ted Enik. **Production Assistants:** Rita Eisenstein, David Hirsch, Dan Battles. **West Coast Staff:** Scot Holton, Bob Skotak. **Contributors This Issue:** John Beardsley, Charles Bogle, Malcolm Brenner, Tom Burman, Arthur C. Clarke, Tom Craven, Ted Enik, Scot Holton, George Howell, J. Allen Hynek, Joseph Kay, Ron Miller, Mike Minor, Jim Oberg, William Pratt, Marlys Sherman, David R. Smith, Robin Snelson.

output

The other night I picked up one of those supermarket check-out-rack magazines—the kind usually aimed at housewives. I discovered two or three fascinating news items. One dealt with new medical discoveries about the causes of tooth decay and with chemical research that may soon give us vitamin-like capsules, ending forever the terror of the dentist's drill.

A few days later I bought a general news magazine, flipped to the architecture section, and read a captivating description of the new Manhattan skyscraper that had been constructed with a slanted roof of solar panels. This stunning design may revolutionize the power needs of large city office buildings.



Just yesterday I saw a magazine advertisement offering video cassettes of complete feature movies, playable on any home system, at a fraction of what the film format would have cost. I laid this magazine aside and realized, to my great surprise, that I was excited and smiling . . .

Now, I don't have a scientific bone in my body. I don't know anything about medicine, solar energy or electronics. I've never studied these fields, and I don't intend to. Yet, as I thought back over the articles, news items and ads that have always had the most positive effect on my emotions—they usually involve some kind of science.

It's easy to understand why front-page political double-talk doesn't lift my spirits. It's easy to understand why movies about losers and TV shows about "those ordinary folks next door" fail to excite me. It's easy to understand why all the cultural garbage we are bom-

barded with has profoundly *negative* effects on our emotional outlook toward life. But why does science almost always send me soaring?

First, it is a field in which Man's *rational* faculty—his ability to see, understand, learn, create and triumph—comes shining through. It is a field which absolutely demands that Man rise to the highest point of his intellectual arc—because there can be no cheating or double-talk with the hard laws of nature.

Second, the field of science is necessarily *purposeful*. Every test must have a goal and, theoretically, every goal must benefit human beings. There is no place for aimlessness.

Third, the field is populated by people who possess the kind of keen mind—and zeal for the activity of living—that *ought* to be in *every* profession. The losers and ordinary folks don't last long in the research and development labs.

Imagine yourself living in a world in which, suddenly, all the scientists boarded a fleet of spaceships and departed for outer space. Imagine the *feeling!* There would be no more innovations; no more discoveries; no more daring new experiments—just the same safe tried-and-true routines. You might not miss the scientific community *directly* because you probably never actually see them working (they're generally rather socially invisible people), but you would miss the magazine articles telling you of their research—letting you know that *somewhere* there are magnificent people busy creating the future.

I'm sure you'll agree that a world without scientists is a grim thought indeed.

We all know and appreciate the *practical* benefits that scientists bring into our lives: they make us healthier and extend our life expectancies; they create systems and machines that reduce our physical efforts and multiply our powers; they devise gadgets that entertain us, transport us, comfort us, and protect us. We know that our lives are physically and emotionally improved because of the people of science, but it's time we paused to toast these special people for a role they play in our lives, a role that usually goes unnoticed.

Here's to scientists as sources of excitement, happiness and inspiration—here's to scientists as heroes!

Kerry O'Quinn/Publisher

input

Because of the large volume of mail we receive, personal replies are impossible. Comments, questions and suggestions are appreciated, however, and those of general interest may be selected for publication in future issues. Write:

FUTURE Input
475 Park Ave. South
8th floor suite
New York, NY 10016

KUDOS

. . . I want to thank you for sending me a copy of FUTURE magazine. It is certainly a handsome and well produced publication, and it is very refreshing to find a positive attitude towards science and technology and towards the monetary rewards of hard work. Science, after all, is simply an organized way of studying the marvelously variegated universe we live in, and technology is simply our way of dealing with it. So far, no one has come up with a better way of interacting with the cosmos. I look forward to seeing more issues of the magazine, and I certainly wish you best of luck in your future endeavors.

Mark R. Chartrand III
Chairman
The American Museum-Hayden
Planetarium
New York, New York

. . . Thank you for the first issue of FUTURE. It seems to be most interesting, and we wish you good luck with it. I am certain that [Mr. Heinlein] will read FUTURE with great interest, and he sends his best wishes to your new enterprise.

Virginia Heinlein
(Mrs. Robert A. Heinlein)
California

. . . FUTURE is beautiful. I was very thrilled to see it. The first issue was a beautifully executed job. This magazine will one day take its place among the classics. I wish you lots of luck.

George Pal
Hollywood, Calif.

. . . Love it! Love it! And now, FUTURE too! Love it! By all means, keep doing what you are doing and here are a few articles I'd like to see: Features on notable movies such as *Dark Star*, *Silent Running*, *THX 1138* and others that didn't get very good distribution. Space (NASA) news. Features on Soviet exploration (what are they going to be doing in the next couple of decades), future energy sources, science news and the entire Apollo

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missions (including Apollo 13). I hope that holds you for a little while. I can hardly wait to see what you do with FUTURE. Looks terrific!

George Perkins
Brookings, SD

SECRET ORIGINS

... CE3K spells Trek. It would seem that no one realizes that Teri Garr, who has a leading role in *Close Encounters Of The Third Kind*, also had a role in a *Star Trek* episode. She played Roberta Lincoln in "Assignment Earth."

Bob West
Benicia, Ca.

Not only did she have a starring role in the episode but it was her very first television appearance. Oddly enough, the girl now associated with SF-fantasy circa '77 (via both CE3K and *Oh God!*), almost achieved stardom in this first acting assignment conjured up by Gene Roddenberry. That particular episode of *Trek* was a pilot for a regular *Assignment Earth* series. Had NBC picked up on it, Teri would have been an SF star back in the sixties.



ENVELOPE ART

Each morning the postman delivers stacks of mail to our office, and we now spend the first half of our working day sorting, reading and processing mail orders and communications. Frequently our spirits are lightened by some incredible lettering and cartoonery that readers create for their correspondence with us. Ronald H. Fontes of Clarksville, TN, for example, never fails to delight us with his super pen and brush work. We thought the rest of our readers might enjoy seeing what arrived on his latest envelope. We don't have time to reply individually so please accept this as an acknowledgement and "thank you" to all our artistic readers!

HEINLEIN WANTED

... For decades, Robert Heinlein has been putting out outstanding science fiction. But for some reason, no movies based on his works have ever been produced (except possibly a movie I saw on television years ago called *The Brain Eaters* which could have been loosely based on *The Puppet Masters*). Now that science fiction has come out of the closet, I was wondering if any of his works have been considered for production?

Rick Tauersley
Anacortes, Washington

The Brain Eaters wasn't a Heinlein film, although it borrowed freely from the concept of *The Puppet Masters* (a theme, by the way, which has been used quite often in Heinlein-inspired-but-not-credited productions including episodes of *The Outer Limits* and *Star Trek*). The only Heinlein-inspired film that acknowledged its source was the 50s classic *Destination Moon* which evolved from a work by the author called *Rocketship Galileo*. As for the current status of his works, no film producers at present have announced plans for a Heinlein motion picture, although his novels and short stories are certainly among the finest ever written in science fiction.

PREHISTORIC PUZZLER

... I've been wracking my brain trying to remember the name of a TV show shown during the sixties. It was about some astronauts who ended up in the stone age. It was a comedy. Do you think you can give me some information on it before I go nuts?

Joe Bokor
Corallis, Oregon

Here's hoping we reach you in time. The series in question was a terminal comedy entitled *It's About Time*. The show aired on CBS briefly in 1966 before being cancelled. It starred Jack Mullaney and Frank Aletter as astronauts Hector and Mac. Also featured were cavefolks Imogene Coca and Joe E. Ross (*Shad and Gronk*).

CONTROVERSIAL ISSUES

... Judging from your first issue, the future of FUTURE looks very bright indeed. The best thing in this first issue was the first article in it: Kerry O'Quinn's analysis of the Concorde controversy, one of the most sensible commentaries on the subject I have seen. Less sensible was Harlan Ellison's view of the Equal Rights Amendment. The ERA involves serious legal ramifications that are sufficiently complex in their potentialities as to cause reasonable men to differ on the wisdom of the proposition. Mr. Ellison certainly has a right to express his opinion, and it is appropriate for FUTURE to report it; but I hope SF fans will not accept uncritically his call to join a "boycott" of states and businesses that are situated in states whose legislatures disagree with Mr. Ellison's

analysis of the issue. This new form of "blacklisting" is no more justifiable than the old kind; if anything, since it seeks to use economic force against those who have an honest intellectual difference of opinion, it is worse.

Mark Koldys
Dearborn, MI 48126

Not only reasonable men, but reasonable women are divided over the ERA. However, the use of pressure group tactics to support a particular viewpoint is a time-honored American tradition—a boycott is hardly the same as a blacklist.



WHO'S THAT KNOCKING AT THE DOOR?

... In the movie *Close Encounters Of The Third Kind*, there's a scene where the little boy played by Cary Guffey opens the door to see the aliens. When he opens it you see a bright lighted figure away to the right. Is that just the light from the ship shining on the trees or is it one of the aliens?

Joe Munoz
St. Louis, Mo. 63110

The figure at the door is definitely humanoid. It is either a curious alien or a slow moving film technician caught in the camera's eye.

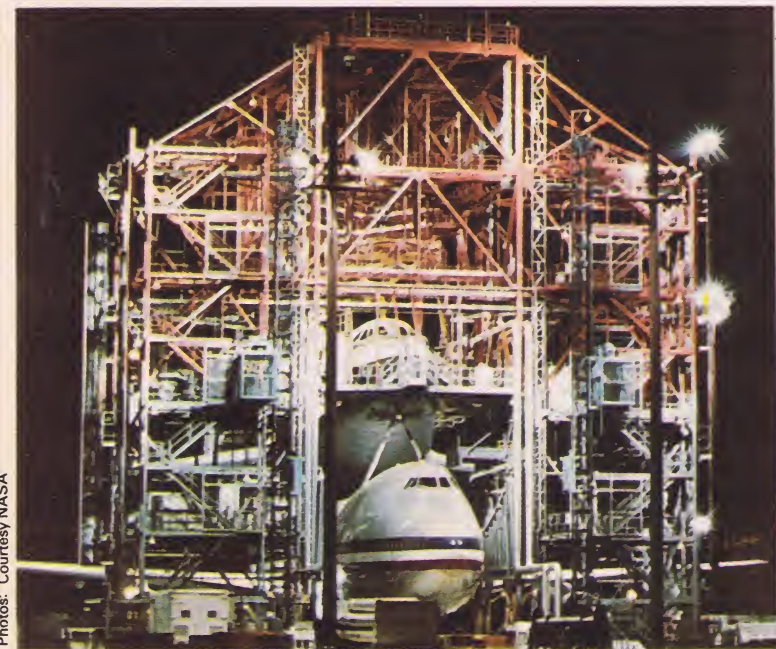
STAR WARS SABRES

... Could you tell us in what other SF shows, besides *Star Wars*, something like the light-sabres were used?

Darlene Rowland
Rt. 1, Box 166
Amarillo, Texas

Powerful rays, of one origin or another, have been used in SF filmdom from its inception; from lasers to phasers to the hideous death rays shot from the Martian war machines in War Of The Worlds. Star Wars, however, was the first to unite this standard in science-fiction weaponry with the classical combat concept of the sabre duel.

THE ERA OF THE SPACE SHUTTLE



Left: The Space Shuttle *Enterprise* being mated to a 747 for flight stability testing. Above: The *Enterprise* comes in for a perfect landing during its free-flight testing. Built as an experimental vehicle, it will be re-fitted and made operational.

Next spring the dramatic first launch of the Space Shuttle (depicted on the cover) will signal an equally dramatic shift in the way we think about the space program.

Ten years ago it seemed as though traveling in space would always be the province of steely-eyed, crewcut astronauts. And after the successful conclusion of the Apollo/Moon landings, "manned" spaceflights were being looked on as a thing of the past. Indeed, there was a public ground swell of opposition to pouring billions of dollars into the space program when there were clearly pressing problems to be tackled right here on Earth.

NASA's liberal budget was pared down and the space agency was forced to justify its work in terms of Earthly benefits. Recently the focus has been on communications satellites and Landsats (Earth resources satellites), endeavors which obviously help the quality of life here and point up the wisdom of using space to our advantage. Some useful things were learned on Skylab, the orbital laboratory fashioned from leftover Apollo hardware where astronauts Gibson, Pogue and Carr stayed a record 84 days. And Apollo-Soyuz was a nice gesture—handshakes, caviar and vodka in orbit—but somehow unsatisfying. Except for some chilling talk of killer satellites and nuclear satellites and the occasional robot landing on Mars, most

of us will admit that the official space program is, in terms of its present goals, uninspiring.

Next year we enter the "Shuttle Era," a new chapter in the space program that will see the return of *people* to space and the beginning of new enterprises in orbit.

NASA can justifiably boast that its Space Transportation System—the shuttle orbiter and all that goes with it—is the first completely reusable spacecraft. When its business is completed in space, the orbiter descends to Earth—its white tile belly glowing red hot—and glides in at a steep angle to a fast, unpowered landing. (On initial test flights the Shuttle will land at Edwards Air Force Base, the site of last summer's test landings, because there are plenty of dry lake beds scattered around that area of southern California. Later landings will take place on the new three-mile strip at Kennedy Space Center.)

When the two solid rocket boosters are spent during launch, they sprout parachutes and drop into the sea, to be recovered for later use. The huge external fuel tank, 154 feet tall, is now slated to separate and disintegrate upon re-entering the atmosphere. But there are already proposals to convert those cavernous cylinders into living quarters for future space workers, and Professor Gerard K. O'Neill thinks the giant tanks—crunched up—might make suit-

able fuel for his mass-driver engine.

Because each shuttle can be used as many as 100 times, the cost of getting to and from space will drop sharply. Economy-minded NASA hopes the lower prices and increased capacity of the space shuttle will speed up activity in near-Earth orbit considerably in the next decade.

Already 35 newly hired astronauts (including the first six women) are being trained to assist 27 astronauts who still work for NASA with the projected work load.

A space shuttle crew will consist of at least three, and up to seven members. Two will be pilots and at least one will be a mission specialist, all NASA employees. Other crewmembers will be scientists who are not employed by NASA (called payload specialists) who will go along to perform specific experiments. Two payload specialists—one American, one European—will fly on the shuttle in 1980 to work in Spacelab, a "shirtsleeves" laboratory that was designed by the European Space Agency to fit in the shuttle cargo bay.

Next year begins a series of six test flights. In 1980 the shuttle should be "operational," and by the mid-eighties NASA envisions a small fleet of shuttle orbiters routinely flying to space on a weekly basis. What are all these people going to be doing on their frequent trips off-planet?

For the first couple of years, NASA will be busy ferrying up satellites—for the military and other government agencies, for foreign governments and for commercial customers. Other tasks in the early years will be scientific and experimental in nature. Scientists who want to study the long-term effects of the space environment on certain materials (photovoltaics, metals, paint, etc.) will have their experiments dropped off in orbit by the first operational shuttle flight. The experiments will be installed in something called LDEF (Long Duration Exposure Facility), a giant experiment rack which fills nearly two-thirds of the shuttle's 15 by 60-foot cargo bay. The LDEF will be picked up nearly a year later, and the experiments returned for the scientists to examine.

Scientists working on Spacelab will perform experiments to determine how to use the special properties of space—hard vacuum and zero-g—for manufacturing, processing and biological research.

The shuttle will ferry interplanetary robot spacecraft such as Galileo (the Jupiter orbiter probe) to low-Earth orbit and dispatch them to the outer planets.

And on most shuttle flights, a few of the famous Getaway Specials will be stashed in odd corners. The bargain-priced, standby spaces have been reserved by more than 100 people now, all of whom have paid \$500 down for the privilege of flying a self-contained experiment (less than five cubic feet in volume, weighing less than 200 pounds) at a cost of \$10,000—on a space-available basis. Who knows what the eclectic group of experimenters (including Steven Spielberg, Dow Chemical and high school and college students) will be doing?

Obviously things are starting to happen again in space. But where will all this activity be taking us? The space shuttle still sounds essentially like a delivery van, making quick and efficient trips to orbit and back. It can stay aloft for a week—up to 300 days with extra supplies and a power module under development. It was learned on Skylab that humans adapt better—and come back healthier—after longer stays. Thirty days, in particular, is an awkward duration in space for the human physiology.

The next logical step is a permanent space station or space construction base. But NASA officials are hesitant to plan that far into the future. Right now they're stretching the budget to get the shuttle flying on time, and no long-term goals are clearly defined. Officially, NASA is lukewarm on ideas like space colonies and solar power satellites (although it's not difficult to ferret out supporters within the agency).

While top NASA administrator Dr. Robert Frosch (an old Navy man)




Godzilla on Monster Island

Photo: © 1978 Toho Studios

WAR IN SPACE—STAR WARS, NIPPON STYLE


During the 50s and the 60s, Toho studios in Japan became well known for producing some of the biggest science-fiction film fantasies in existence, from the original *Godzilla* to the Technicolored *The Mysterians*. Of late, activities in Tokyo have slackened off for the SF-oriented Toho, with only *Godzilla* surfacing occasionally for a comical tag team match with a screen monster. The box office ballyhoo caused by *Star Wars* may have changed all that however, causing a resurgence in Nipponese science fiction. Toho is currently rushing to complete *War In Space*, a two million dollar SF swash-buckler aiming for this year's Christmas season. According to Toho president Tomoyuki Tanaka, the film was written well over a year ago but didn't really get off the ground until *Star Wars* and *Close Encounters* began sparking bursts of SF-mania across the globe. *War In*

Space is being directed by Jan Fukuda, a film technician responsible for most of the *Godzilla* films made during the late sixties. Special effects are being helmed by Japanese miniatures expert Akiyoshi Nakana. Nakana shook up oriental audiences a few years ago with his epic presentation *Nippon Chinbotsu*, or *The Submerging of Japan*. In that adventure, known stateside as *Tidal Wave*, Nakana created monstrous ocean disturbances which reduced Japan to geographic non-existence. This time around, Nakana will be working in space, promising a *Star Wars* blend of entertainment and spectacle. Also in the wings from Toho are a seven million dollar co-production (with Euan Lloyd and Hammer Films) of *The Loch Ness Monster* (boasting a three million dollar SFX budget) and a few more *Godzilla* films, the next being *Godzilla On Monster Island*. 

wonders publicly if "people living in submarines in space" is the right direction to be heading, and while Senate budget hawk William Proxmire vows "not a penny for this nutty fantasy" (in response to a *60 Minutes* segment on O'Neill and space colonies), grassroots support for the "unofficial space program" is growing.

Congress is now considering a resolution (H.R. 451) which, if passed, would fund a study to determine if space colonies and solar power satellites should become a national goal before the year 2000. People are growing more com-

fortable with Dr. O'Neill's space colonies and some people (notably members of the L5 Society) even want to help build them and, eventually, live there.

NASA may not be ready to officially admit it yet, but the space shuttle's potential role in opening O'Neill's "High Frontier"—where, conceivably, all kinds of people might live and work and settle in space habitats in the not-so-far-off future—is the shuttle's most attractive potential to an increasing number of people who are interested in moving off the planet. 

LASERLIGHT DANGER



At the Hollywood Bowl *Star Wars* concert, laserlight is reflected over the audience.


The Food and Drug Administration has sent out letters warning rock groups, booking agencies and discoteques about the dangers of laserlighting. Laserlight, currently the rage of rock concerts, is often reflected off pieces of glass, rotating mirrors, colored balls and other shimmering surfaces for dramatic effect. The spidery three dimensional laser beam is then sent floating over the heads (or into the faces) of the audience. Should a single

beam of laserlight shine into the human eye for only an instant, the FDA admonished, permanent damage could result if the beams exceed 1 milliwatt per square centimeter. The FDA advised entertainment organizations to restrict the use of the kaleidoscopic effect to the less hazardous areas of rock halls and discos, such as the ceiling or walls.

"This is a reminder to rock groups and others using it to add to the visual excitement of their entertaining," the

FDA cautioned, "that the government is not about to wait for 200 recorded eye injuries from laserlight, before it puts a stop to this obvious hazard." The FDA stated that one of the most frightening dangers of the laserlight rage arose from the fact that the eye injuries might not become apparent for weeks after the incident . . . sometimes leaving the victim puzzled as to the cause of the sudden disruption of sight.

A spokesman for the FDA suggested that all those who wish to continue using the startling optical effects follow the standards set by that organization and keep the laser power to a point under 1 milliwatt per square centimeter.

The FDA expressed hope that national publicity concerning the problem plus pressure arising from concerned consumer groups would end the misuse of laserlight. Should all else fail, however, the FDA warned that there would be sterner measures at their disposal. "Our inspectors will be fanning out across the country, with equipment on them to measure the strength of laser beams used in these entertainment areas, and if any of the rock or other groups are not conforming, we'll simply move in and remove their equipment, and we'll haul them into court." 

THERE'S POWER IN THE WIND

As our nation's energy needs increase and our energy resources dwindle, and as we become more dependent on foreign sources, practical alternate energy sources must be investigated and developed.

Wind-power systems have been used for centuries as a source of energy. Their applications have ranged from pumping water and grinding grain to generating electricity. Certainly the old standard, the farm windmill, was as common a sight as a barn and silo.

From 1930 to 1960 considerable interest existed in Europe in developing large wind-driven generating systems as a source of electric power. However, interest in these systems declined because they were not cost competitive with fossil fuel systems of that era.

Using the wind as a clean nondepletable source of energy has been proved technically feasible in past efforts, and it is again being investigated as a viable, alternative source of energy for the future.

Pictured here is the NASA 100 kW experimental wind turbine that has been installed at the Sandusky, Ohio Plum Brook Station. Looking like something from the Wells film *Things To Come*, it is the world's second largest wind turbine in operation today.

The turbine is mounted on an open truss tower 100 feet high. The rotor contains two aluminum blades each 62½ feet in length and weighing 2000 pounds. The generator reaches its maximum output of 100 kW in an 18 mph wind; it automatically shuts down by feathering the blades when the wind speeds exceed 30 mph.

The wind turbine is operated automatically by a computer. A technician located some 60 miles away at NASA's Lewis Research Center in Cleveland is now able to activate a small computer which takes over total control of the wind turbine.




Photo: NASA

This computer monitors the wind and commands the turbine to orient itself with the wind when the latter exceeds 8 mph in velocity. When the wind speed reaches 12 mph, the blades start to rotate, achieving a 40 rpm rotor speed. The machine continues to operate automatically until the wind speeds exceed 30 mph or drop below 8 mph, at which time the computer temporarily shuts the wind turbine down until proper winds recur.

The 100 kilowatt experimental wind turbine is the first of its kind in the Department of Energy/NASA Wind Energy Program. Since its dedication in October 1975, it has yielded a wealth of information vital to the on-going wind energy program which will include three 2000 kilowatt machines, one 2500 kilowatt machine.

The largest wind turbine in the world is located at Clayton, NM and began operation on January 28, 1978. This turbine will generate up to 200 kilowatts of electricity and is the first federally funded commercial wind generator in the U.S.

Other experimental systems are to be installed in Culebra, Puerto Rico and Block Island, Rhode Island. A two megawatt system has been proposed for Boone, North Carolina. 

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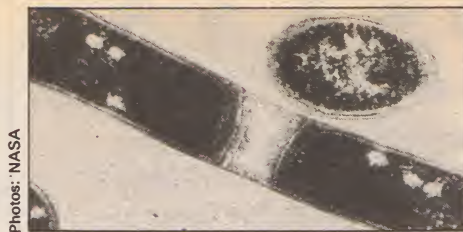
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The last of the *Apes* series reveals how Caesar fought for and won new freedom for all of the inhabitants of the planet Earth.

SCIENTISTS DISCOVER A "NEW" LIFE FORM

Scientists studying the evolution of primitive organisms for NASA and the National Science Foundation have identified a "new" form of life on Earth that is hard to find in nature and that may date back to the planet Earth's first billion years. The new life form, previously thought to be a type of ordinary bacteria, is described as a "third kingdom" of living material—composed of ancestral cells that abhor oxygen, digest carbon dioxide and produce methane. They represent a line of evolutionary descent that is totally separate from the two traditionally recognized lines: animals and plants, and bacteria.

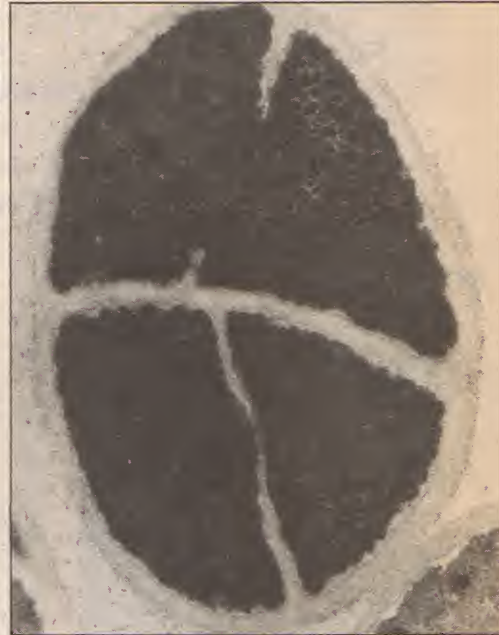


Photos: NASA

The organisms may be the oldest of life forms as well, coming not only before plants and animals, but also before bacteria.

The finding was made by a research team headed by Dr. Carl Woese, Professor of Genetics and Development at

Left & Below: These pictures taken with an electron microscope show two different species of the newly-discovered organism.



DEL REY LAUNCHES HARDCOVER LINE

A little over a year ago, Judy-Lynn and Lester del Rey shook up the paperback book industry by beginning their own Del Rey Books line, a paperback publishing house specializing in science fiction and fantasy work. Their aim was to take SF and fantasy titles out of the "cult following" book category and package them in a manner reserved for most mass market book titles. Their success was startling. Within their first year of publication, Del Rey Books presented George Lucas' novel, *Star Wars* (selling over 4,000,000 copies!), and Terry Brooks' epic fantasy adventure *The Sword of Shannara* (a hefty work which sold over 250,000 copies and was the first piece of fiction ever to appear in *The New York Times* Trade Best Seller List, staying there for over five months).

This year, the del Reys are expanding their goals for science-fiction literature with the inauguration of a hardcover branch of Del Rey Books. Begun last

month, the Del Rey hardcover line will feature SF titles by both new and established authors and toss them into the literary arena with other potential hardcover bestsellers. Judy-Lynn del Rey, the publishing house's Editor-in-Chief, stressed that the whole purpose of the new expansion was to "take our expertise in science-fiction and fantasy publishing and establish a hardcover line that has the potential of growing into a thriving hardcover imprint of the future. Because Del Rey Books can package and promote science fiction better than anyone else in the industry, it will be possible to find and nurture new science-fiction writers and promote them into the Isaac Asimovs and Arthur C. Clarke of the future."

During 1978, Del Rey will publish at least a dozen titles. The first, *Gloryhits*, is already making its way to the bookstores. Penned by Bob Stickgold and Mark Noble, the novel concerns the perils of recombinant DNA research. Other books on the way are Alan Dean Foster's *Splinter Of The Mind's Eye* (the new adventures of Luke Skywalker), Clifford D. Simak's *Mastadonia* (a prehistoric spacecraft has the ability to travel through time), Robert Foster's *The Complete Guide To Middle-Earth*, James P. Hogan's *The Genesis Machine* (a machine that can either destroy or create), *The Fantastic Art Of Boris Vallejo* (with an introduction by Lester del Rey), Anne McCaffrey's *The White Dragon* (the third of her Dragonflys of Pern series), Fred Pohl's *The Way Of The Future* (a fascinating memoir by one of SF's greatest writer-editors) and Terry Brooks' as yet untitled sequel to *The Sword of Shannara*.

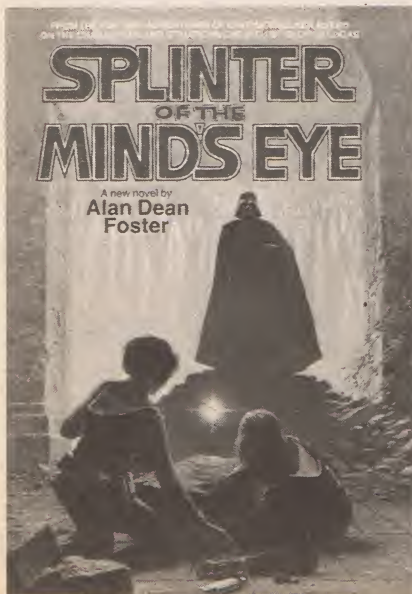
Should the Del Rey Books hardcover line take off (most SF enthusiasts seem to think it will) science-fiction literature just may find itself on the best seller charts in a hardback boom similar to the science-fiction saleability of the early fifties. E

the University of Illinois, Urbana. The genetic tracking effort of his group lasted over five years. Woese has yet to name the organism, known at present as either archaebacteria or methanogens. Prior to the discovery of this 3.5-4 billion-year-old-life, the oldest form of life was bacteria, believed to have evolved about 3.4 billion years ago.

These new, older methane-producing organisms appear to be ideally suited for what scientists believe to have been Earth's primitive atmosphere. They can get all their food and energy from very simple compounds such as carbon dioxide and hydrogen, the main gases in a primitive atmosphere. They do not use any of the complex chemicals most other organisms require as food, such as sugars and amino acids. Certain of the species grow best at high temperatures, in the range of 65-70 degrees Celsius (150-170 degrees Fahrenheit). They now can be found only in niches swept clean of oxygen, such as deep in the hot springs at Yellowstone.

Dr. Woese believes that the recent findings may provide knowledge of one of the missing stages of mankind's evolution: the chemical stage, which immediately preceded the stages of life as modern science knows it. At present, Woese insists, a tremendous gap exists in man's understanding of life.

The researcher said that, should the discovery lead to science finding out more about how life came about on this planet, the world may find itself in a better position to understand and discover life forms that may have evolved elsewhere in the solar system—or beyond. E



Star Wars artist Ralph McQuarrie's cover illustration for Foster's novel. (It is not the source for the second *SW* movie.)

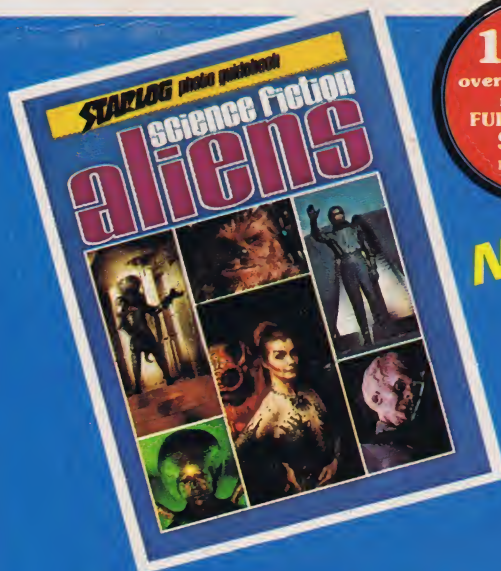
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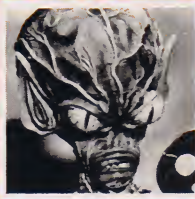


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"WHOLE SPACE" CATALOG

This book is about how to take Space personally. . . ." So starts Stewart Brand's new volume entitled, simply, *Space Colonies*. Throughout his publishing career Brand has always managed to be interesting. Also: controversial, praise-worthy, damnable, clever, complete, inquisitive, perplexing, clarifying and concerned.

As editor for all the editions of *The Whole Earth Catalog*, he has continued his pro-environment ways in recent years by producing the *CoEvolution Quarterly* out of Sausalito, California. The magazine, affectionately known as *CQ* to its over 40,000 readers, concerns itself with every aspect of Man's existence—not only on Earth, but in worlds beyond.

It is just this concern that has led Brand to edit his new Penguin Publication under the auspices of *CQ* and *The Whole Earth Catalog* offices. Within *Space Colonies*' 160 pages, all manner of pertinent and fascinating information can be found under the headings "Vision," "Debate," and "Space."

The "Vision" section, according to Brand, is "Gerard O'Neill's domain—progressing from broad propaganda to

Left: A close-up of the central hub of a torus (or donut-shaped) space habitat. The habitat rotates, creating an artificial gravity along the outside rim where the people live. (Note docking bays on hub.)

Photo Courtesy of NASA



BARREN ANTARCTIC YIELDS LIFE

Scientists working for NASA and the National Science Foundation have discovered living organisms hidden inside rocks in the frozen deserts of the Antarctic.

The discovery—made in the Dry Valleys, a region whose harsh climate resembles conditions found on Mars—significantly extends the known limits of life on Earth, and also carries important implications for the search for extraterrestrial life.

The discovery was made by Dr. E. Imre Friedmann and Dr. Roseli Ocampo-Friedmann of Florida State University at Tallahassee, a husband-and-wife team which has been searching for microbial life in rocks for more than 15 years.

The newly discovered microorganisms—bacteria, algae and fungi—have been isolated and are growing in laboratory cultures, where they are being studied for clues to the secret of their endurance.

The Friedmanns had found living cells inside rocks in the hot desert areas of America, Asia, and Africa, but the Dry Valleys of Antarctica have long been regarded as lifeless. No plant or animal life is visible on the bare cliffs, and microbiological investigations indicated

that they are lacking any native microbial life.

Although part of the "White Continent," the Dry Valley region of the Antarctic is generally free of snow and ice, the combination of dryness and cold, as well as the nearly constantly blowing winds, results in an environment which is among the world's harshest.

In this frozen brown desert, mountain ranges as high as 2,400 meters (8,000 feet.) alternate with valley floors, some of which contain permanently frozen lakes of high salt content.

Far from being lifeless, the Friedmanns found that the Dry Valleys have a widespread rich microbial vegetation

under the surface of rocks, in the air spaces of porous rocks or in fissures.

When the rocks are broken open, the organisms are seen as a dark greenish layer, a few millimeters deep.

Dr. Friedmann said the tiny organisms take refuge from an unfavorable climate by occupying a microscopic niche where favorable conditions for life prevail. He points out: "The microclimate between the minute grains of the rock may be quite different from the macroclimate outside."

The organisms colonize light-colored, semi-translucent rocks in which the intensive Antarctic sunlight penetrates several millimeters deep. Thus, while

Photo Courtesy of NASA



technical details to anecdotes." Following a presentation of O'Neill's article based on his popular book *The High Frontier*, his testimony before the House of Representatives Sub-Committee on Space Science, and an interview conducted by the editor, he comes to the real hot stuff: 76 pages of discussion, disagreement, comment, insult, and condemnation by some controversial figures in the Space and Earth sciences, including Carl Sagan, Ken Kesey, Paul Ehrlich, T.A. Heppenheimer, R. Buckminster Fuller, Lewis Mumford, John Holt, Timothy Leary, and Jacques Cousteau.

Brand categorizes them as "highly intelligent attacks stung into life by the Space Colony idea." However one considers them, they all make entertaining, thought-provoking reading. The final section consists of articles and interviews with the lucid young astronaut Russell Schweickart, as well as further contributions by Mr. Sagan and Gov. Jerry Brown of California.

The reading pleasure is further heightened by imaginative cartoons featuring such "underground" greats as Larry Todd, Anne Norcia, and Jay Kinney. So, if you'd like to know how to relieve yourself in space, or are concerned that the U.S. State department has forbidden the use of the term "Space Colony" because of international anti-colonial feelings, or are remotely interested in the development of our species and its place in the future, this five dollar volume is worthowning. [P]

the temperature outside (and on the surface of the rock) may be well below freezing, inside the rock it may rise to relatively comfortable levels.

The penetrating sunlight also provides energy for photosynthesis, while the uppermost rock layer protects the microorganisms from damage due to excessive radiation and drying up, Dr. Friedmann said.

Friedman also said that wherever the "proper" rock types occur, it is most likely that they are colonized by microbes, algae or fungi.

Dr. Richard S. Young, NASA's chief of planetary biology, points out that the Dry Valleys in many ways approach the environmental extremes found on Mars by the 1976 Viking landers. These landers searched the Martian soil for signs of microbial life and organic molecules, apparently without success.

"If Martian life forms exist only in the interior of Martian rocks, as is principally the case in Antarctica, that could easily serve as an explanation for the lack of evidence on Mars," says Young. "Viking could not break open rocks and analyze the interiors. This will have to be considered when NASA designs further attempts to study planetary surfaces for evidence of life." [P]

NASA BIOTELEMETRY AIDS CEREBRAL PALSY VICTIMS



NASA Biotelemetry unit in actual use.

Used extensively throughout the NASA space program to observe astronaut vital functions from the ground, biotelemetry is the monitoring of physiological signals sent by radio wave.

This standard "man-in-space" technique has found application here on Earth at the Children's Hospital in Stanford, California—assisted by NASA and the Stanford Biomedical Application team—with the cerebral palsy problem.

Children with cerebral palsy have nervous system defects which lead to unpredictable and crippling muscle spasms and loss of coordination. Many of these children have great difficulty walking because certain muscles are in a constant state of contraction.

Surgical techniques can lengthen muscles or tendons to improve the child's walking pattern, but it is vital to diagnose accurately the particular spac-

ticity problem of each patient; the individual muscles causing the handicap vary greatly from child to child. It is difficult, by physical examination alone, to determine precisely which muscle groups are most involved.

The standard electronic tool for monitoring these muscle groups is the EMG (ElectroMyoGram), which involves numbers of electrical cables rigged from sensors on the patient to a recorder. The number and weight of these wires interferes with the subject's normal walking pattern.

Freedom of movement is very important to the child with cerebral palsy, who frequently has an impaired sense of balance and lacks the muscle control to protect himself when he falls. Telemetry offers a means for unencumbered recording of the child's true gait pattern, information extremely helpful to the physical therapist and orthopedic surgeon in determining the need for corrective surgery, evaluating various types of braces, and deciding whether certain muscle-relaxing drugs might prove effective.

With the help of the L & M Electronics Co., NASA and Children's Hospital at Stanford introduced an improvement which eliminates the waist-pack and connecting cables previously used. Miniature transmitters, about the diameter of a half dollar, are affixed directly over the muscle group being studied. Each transmitter has its own battery and a pair of sensing electrodes. Because they are small and lightweight, several transmitters can be used to broadcast EMG signals from both legs simultaneously.

This important advance is now in active use by the Children's Hospital at Stanford for the cerebral palsy application. It appears to have broad potential, because it could be used for monitoring other types of physiological signals when biotelemetry offers a clinical advantage. [P]

The child is able to walk unimpeded by EMG cables and still be electronically monitored.





Art: Ted Enik

INSIDE CE3K

I'm interested in pure experience rather than linear plot," said Doug Trumbull of the direction his work has taken. When first asked to join *Close Encounters*, he agreed to return to a relatively conventional mode of filmmaking because, "I saw its major end-sequence as an experience that almost transcends plot." Which is not to sug-

gest that *Close Encounters* didn't present special visual challenges all its own: "Steve and I agreed that we didn't want hard edges," Trumbull explained. "We decided to work with light, suggesting, rather than showing shapes." Many of the UFOs that Trumbull designed are consequently illusory objects with no fixed boundaries. Each of these vehicles

is the result of as many as eight superimposed exposures, beginning with clear plastic shapes illuminated by neon, continuing on to complementary effects that involved smoke screens, fiber-optic lens flares and computerized synchronization. Trumbull and Spielberg worked with a sense of humor as well, placing lights on some of the craft in patterns suggesting eyes and teeth. Getting down to the real minutia of *Close Encounters*, attentive audiences should be on the lookout for a miniature R2D2, a toy shark, a model of Darth Vader's escape vehicle, a World War II fighter, and a tiny Volkswagen bus, all of which were used in a series of in-jokes to "decorate the surface of the Mothership." As well, no one as yet has taken note of Spielberg's various friends who were smuggled into the movie. For example, the producing-directing team of Hal Barwood and Matthew Robbins, who wrote Spielberg's first theatrical feature, *The Sugarland Express*, received screen credit as two of the missing pilots who make their appearance at the movie's climax. Willard Huych, who along with his wife Gloria Katz is best known for writing *American Graffiti*, makes an uncredited appearance as a man with a clipboard in the government's base camp.

The Mothership was originally conceived as an enormous black craft, which is why Spielberg filmed a shadow passing over the personnel in the landing area. But when the black ship was designed, it lacked the necessary drama, so Trumbull came up with the gigantic, multicolored version used in the finished film. To solve the problem of the previously filmed shadow, he suggested that the ship makes its entrance without benefit of illumination, throwing the light switches only when it reaches port. Yet, for all his spectacular achievement, Trumbull regards his work on *Close Encounters* as "a detour" that will allow him to continue his own experiments. He is currently outfitting a theater in Los Angeles for a demonstration of "Super 70," a new method he has invented of projecting film at 60, rather than the conventional 24 frames-per-second. "Super 70" is said to achieve a giddy new sense of being there. [E]

SON OF DISC WARS

The current boom in science-fiction soundtracks, rock epics and disco dementia has finally spawned the most logical SF musical outing to come along in ages. Zubin Mehta and the Los Angeles Philharmonic have recorded a classical SF album, excerpting themes from *Star Wars* and *Close Encounters Of The Third Kind*. Devoid of alien growls, floor tom-toms and finger-

popping background singers, the melodious effort is being distributed by London Records. The album's first side contains the entire *Star Wars* suite, first performed last fall at the Hollywood Bowl. The second side presents a specially prepared *Close Encounters* suite written by *Encounters* composer John Williams. Chewbacca, the most notable long-hair music fan featured in either of the films, was unavailable for comment. [E]

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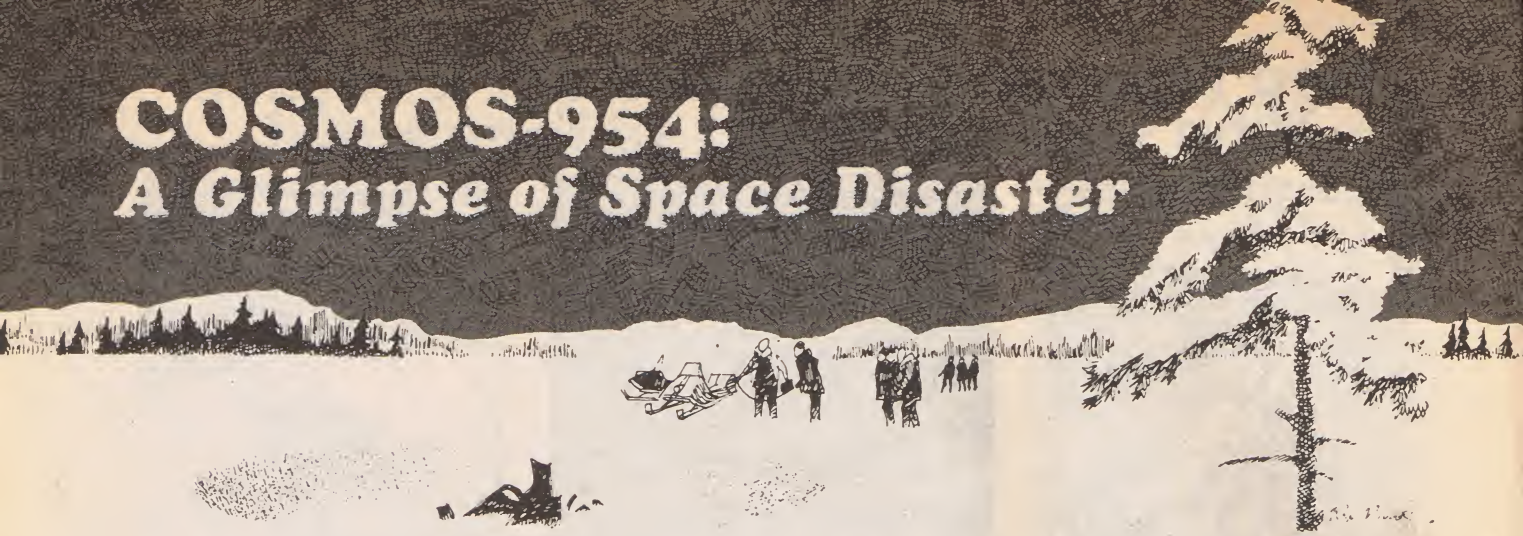
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COSMOS-954: A Glimpse of Space Disaster



By JAMES OBERG

The newspaper headlines were straight out of a fifties science-fiction film: KILLER SATELLITE CRASHES IN CANADA! Only this time the story was real. The crashlanding of the Soviet nuclear-powered satellite, *Cosmos-954*, north of the American border was a nightmare come true. The effects of the event were felt immediately. Politicians started talking in scientific jargon while many scientists issued distinctly political statements. An interest in space law was (belatedly) revitalized. People began looking to the heavens with increased anxiety. The spectre of a Russian-spawned war in space hovered over the globe. "Perhaps Chicken Little was right," some joked in reference to the unexpected appearance of the stray spacecraft. But *Cosmos-954's* appearance was no joke.

There are thousands of pieces of junk circling the Earth in various orbits. Most are scraps of metal, lost fuel tanks or grapefruit-sized scientific probes. Others, however, are large affairs, weighing in excess of ten-thousand pounds (one satellite, *Skylab*, weighs two hundred thousand pounds). Radioactive or not, such vehicles could cause damage and casualties when they eventually and inevitably slip back into the Earth's atmosphere, plunging to the ground below. And fall they will. Crashing satellites do not "burn up" as is reported in newspapers. They often break up into smaller pieces, into hand-sized fragments and letter-sized sheets of metal, but by and large the mass of the objects does reach the surface of the Earth. *Cosmos-954*, until late January of this year, was just another one of those anonymous orbiting satellites. It was part of a program the Soviets had been flying for almost a decade, the twentieth shot in the series. Then, something went wrong. Normally, this type of satellite spends a few weeks in a very low orbit before being led into a higher

one. Western observers speculate that this maneuver is prompted by the need to dispose safely of a nuclear-power pack used to power the spy satellite's ocean surveillance radar. Once in the higher orbit, the power pack burns itself out harmlessly in the several centuries it takes before the pack slips back down into the atmosphere. With *Cosmos*, however, this maneuver was never carried out.

The ten-ton payload was observed tumbling in orbit on January 6 and top-secret U.S. Air Force radar sensors allowed NORAD (the North American Air Force Command, a joint U.S.-Canada operation) to alert government officials. (Amateur radio trackers in Great Britain also noticed something was amiss.) The Russians remained silent, apparently hoping that nobody would notice the accident.

As a satellite begins its final orbital decay and heads Earthward, the thin atmosphere a hundred miles up impedes its forward movement and causes it to drop into a lower orbit. There, potential energy is converted into kinetic energy (speed) and, for its last few passes around the Earth, the falling satellite hits record speeds. Until it actually makes its final dive, it is almost impossible to predict where it will actually crash.

America's silence on the imminent swan dive of *Cosmos-954* was probably due to several reasons, although the official explanation for secrecy was to avoid public panic. Soviet cooperation on the potential disaster was needed and any public remark about the spacecraft might have embarrassed the Soviets into a state of political animosity. As it turned out, the Soviets were remarkably candid about the *Cosmos* — once approached by the American government.

But while the Soviets insisted that *Cosmos-954* was an ordinary research payload, Western scientists saw it as a possible weapon. In fact, it may have been the keystone to a Soviet attempt at counteracting one of the most invulner-

able components of America's strategic nuclear strike forces—the Polaris and Trident subs. Reportedly, the *Cosmos-954* ocean scout used up to 100 kilowatts of electricity (generated by 100 pounds of radioactive Uranium-235), making it the most powerful electrical system ever used in space. The radar beams could not only detect surface ships, sources say, but could possibly locate and track shallow submarines as well. In such a case, the retaliatory reliability of U.S. sub missile forces would be seriously compromised.

Nor is this system the first such space weapons complex developed by rocket scientists. Both sides engage in passive reconnaissance and eavesdropping, and use space satellites for navigation, tactical air movement control (weather monitoring), and radar calibration. But Russia also has two other systems: a "hunter-killer satellite," now operational, and a "Fractional Orbital Bombardment System" (FOBS), possibly abandoned but just as possibly operational. What causes analysts the greatest anxiety is that none of these weapons systems seem justifiable in a "second strike" or retaliatory mode of operation. They are all most effective if used for a surprise attack or a first strike.

The killer satellite seems best suited for a sneak attack on U.S. command and control, and early-warning satellites in 24-hour orbits. The FOBS orbital H-bombs seem to be a useful way to approach the U.S. in low orbits, eluding radar detection until the last minute. The nuclear-power naval watchers would mainly be useful in plotting attacks on aircraft carriers and nuclear missile subs prior to the start of a war from space.

All in all, Russia's massive space weapons program is a bit disquieting, despite many hopeful science-fiction scenarios wherein the threat of a war in space cancels out war on Earth.

Aside from the physical calamity caused by the falling of *Cosmos-954*, a very real political calamity arose as well.

Anti-nuclear forces seized the "I-told-you-so" chance to prod President Carter into making a public speech calling for the banning of *all* nuclear-power units from space. (This speech was made in spite of the fact that all American nuclear-power units are encased in protective cannisters which would plunge through the atmosphere *intact*, landing safely without the spillage of nuclear materials . . . as demonstrated in the late 1960s with a fallen unit from a *Nimbus* satellite splashing down in Californian waters. Furthermore, all deep space probes to Jupiter and beyond must use nuclear power in order to work at night on dark planets, since sunlight is scarce in the outer solar system and solar panels are the most vulnerable pieces of hardware.)

The actual danger from the grounded *Cosmos-954* was slight. In the past, American decontamination teams operating under the "Operation Broken Arrow" program have cleaned up broken thermonuclear bombs which were accidentally dropped in Spain, Greenland and South Carolina. They involved far more uranium than did *Cosmos-954*, and twice landed in far more populated regions. The most disconcerting occurrence during the *Cosmos* affair was the fact that, although they were aware of the potential crash, the Soviets did nothing to alert other nations until the U.S. took notice and warned other friendly nations.

Happily enough, the satellite's demise did no real damage and even provided a big plus for American intelligence sources who got to analyze the Russian secret satellite, finding out much about the Soviet nuclear and electronics industries and about the full capabilities of the worrisome interloper from space.

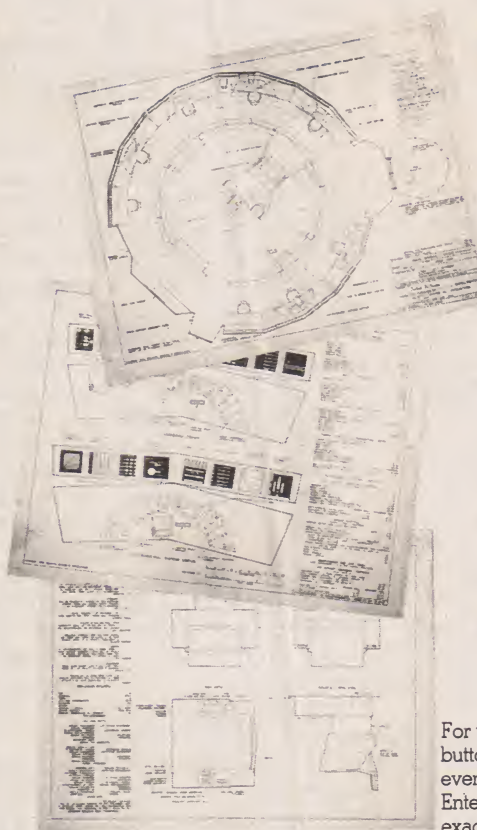
Plans have even been announced to implement a change in the orbital space garbage situation. Within two years, the U.S. Space Shuttle will initiate the world's first satellite garbage service which will allow the retrieval or safe de-orbit of decaying satellites, with their first target being the space station *Skylab*. For a fee, the Shuttle will provide similar service for any government with a falling satellite on their hands.

And so, the entire *Cosmos-954* affair had some positive results, despite its initial doomsday appearance. The most frightening spectre imaginable, a falling radioactive satellite hurtling out of control towards the Earth, became an exciting hunt for pieces of wreckage and possible functions of the craft. For once, a science-fiction scenario concerning a war in space resulted in a happy ending . . . except, perhaps, for the six scientists who were contaminated while searching for the remains of the *Cosmos-954*, and the future ecology of the now-contaminated Great Slave Lake region.

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THE SWARM ARRIVES!

KILLER BEES ARE HEADING FOR U.S.

Washington (AP)—*Swarms of ferocious honeybees that have been known to kill both humans and animals are moving towards the United States from Brazil at the rate of 200 miles a year.*

There seems to be no natural barrier to block the bees, and they could be in North America within four to six years, says a study financed by the Agriculture Department.

"The most alarming and best-known characteristic of Brazilian bees is their aggressiveness," according to the report.

By WILLIAM H. PRATT

The report above actually appeared in the *Chicago Daily News* on August 24, 1972. As bizarre as it may appear, the story of killer bees on the prowl is absolutely true. This modern day horror tale began some twenty years ago when enterprising entomologists brought a few queen bees from Africa into Brazil to strengthen and increase the productivity of the common honeybee. The African strain was considerably more aggressive than their common peers and capable of producing much more honey.

Unfortunately, the queens escaped. They mingled with Brazilian bees and the net result was a mutant strain of insects that apparently would rather attack people and animals than calmly produce honey. They are documented killers. As portrayed in the best-selling novel by Arthur Herzog, they are estimated to arrive in the United States in the late 1980's. As represented in the Irwin Allen thriller, *The Swarm*, the bees will be arriving in theaters around the country in July.

For producer Irwin Allen, immediate disaster is the key to success. Once mainly known for his televised excursions into science fiction/fantasy via such hit series as *Lost In Space*, *Voyage To The Bottom Of The Sea*, *The Time Tunnel* and *The Land Of The Giants*,

Teacher Olivia De Havilland isn't overly enthused about the presences of a horde of killer bees outside her classroom.

Academy Award-winning Allen has, of late, shown a widescreen penchant for total destruction in *The Towering Inferno*, *The Poseidon Adventure*, *Fire*, and now, *The Swarm*.

The Swarm traces the movements of the first vanguard in the bee brigade as they arrive in southeast Texas. They are spotted and identified by entomologist Brad Crane (Michael Caine), assigned to investigate the case by a reasonably worried White House. Crane follows the bees to an ICBM missile base where he watches the furry furies do in the Air Force personnel. Survivors General Slater (Richard Widmark) and Major Baker (Bradford Dillman) soon join the scientist in his search for a solution.

The bees, however, are not impressed with either the efforts of the national defense or the scientific community's research. They continue on a collision course with Houston. Those initially involved with the stinging assault are Air Force doctor Helena (Katherine Ross), famed immunologist Dr. Walter Krim (Henry Fonda), entomologist Dr. Hubbard (Richard Chamberlain), Marysville, Texas school principal Maureen Schuster (Olivia De Havilland) and her two boyfriends Felix (Ben Cooper) and Clarence (Fred MacMurray), TV news reporter Ann Megregor (Lee Grant), water superintendent Jud Hawkins (Slim Pickens) and a local physician, Dr. Martinez (Alejandro Ray).

The first target of the buzzing terrors is the tiny town of Marysville. The bees attack and kill all but one member of a picnicking family before descending on the town itself. Crane and Helena head for the community to both investigate the goings-on and supervise an evacuation. Krim, Hubbard and their legions go to work on anti toxins, vaccines and any other possible means of medical defense. Slater, meanwhile, tries to come up with the necessary military might needed to squash the rebellion.

The bees, however, prove victorious and after wiping out a few communities, completely paralyze Houston, killing

hundreds of thousands. Crane and Slater combine forces and move in for the (hopeful) kill. It's billions of bees vs. the best of humanity with the population of the world at stake. The film's final clash is made even more portentously frightening when one remembers that these bees actually exist!

As eerie a subject as *The Swarm* presents, Irwin Allen had no qualms about filming it. It was just another one of his spectacular "what if" projects that neatly meld fantasy and reality. Granted, production of *The Swarm* presented some unique problems, but the plucky producer managed to circumvent them all. The winged villains of the film, for instance, were needed en masse and in a hurry. Allen dispatched dozens of "talent scouts" who journeyed to Oregon, Washington, Arizona, Nevada, New Mexico and Texas to round up 20 million honeybees. The stars of the 12 million dollar epic were housed, 50,000 each, in 400 hives distributed strategically on the studio lot.

Allen and his technical crew then used a combination of lights and sound waves to guide the bees onto and off the scene as needed. The film did, occasionally, run into snags. In one episode, actress Olivia De Havilland is trapped in a train wreck caused when the bees murder the conductor. She had a choice: she could die in the wreck off-screen or be stung to death with the cameras rolling. "She didn't hesitate a second," Irwin Allen later marvelled, describing the incident. "She said it would be much more dramatic with the bees."

And so, with other cast members watching with morbid fascination, the actress was covered with 4,000 bees from head to waist. Unfortunately, one of the bees got carried away and stung the hapless heroine.

Because of months of preparation and training, accidents involving the bees were kept at a minimum and *The Swarm* emerged as the latest entry in Allen's jovial line of disaster adventures. But for Allen, besieging the world with bees is not enough. On his drawing board at present are such future calamities as *The Day The World Ended* (volcanoes blow their tops), *The Night The Bridge Fell Down* (travelers on it take the plunge) and *Beyond The Poseidon Adventure* (incredible, but true). While Irwin Allen thinks of his films as being nothing more than sheer entertainment, he does manage to scare the wits out of quite a lot of people... including a lot of the actors involved.

Surrounded by publicity material detailing the history of Brazil's real-life killer bees, *Swarm* star Katherine Ross suppressed a shudder in front of reporters. "When I think of this," she said, "it drives me out of my mind. I realize we're only making a picture out of it right now. But what happens later?"

How about a sequel?

Photo: © 1978 Warner Bros., Inc.

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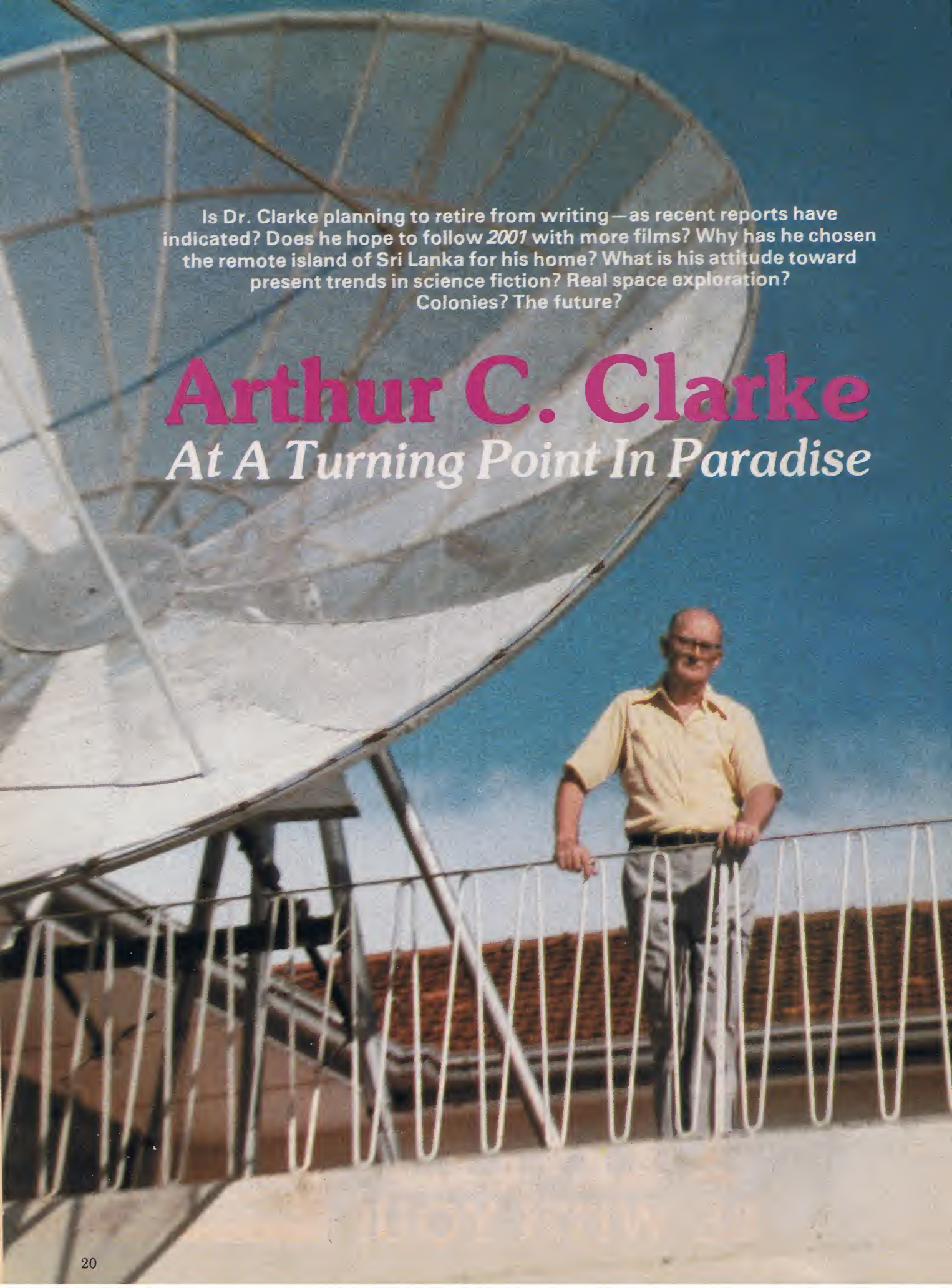


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A large satellite dish antenna dominates the left side of the frame, its metallic surface reflecting the bright sky. In the foreground, a man with glasses, wearing a light yellow short-sleeved shirt and grey trousers, stands on a balcony with a white metal railing. He is looking towards the camera. The background shows a clear blue sky and a portion of a building with a reddish-brown tiled roof.

Is Dr. Clarke planning to retire from writing — as recent reports have indicated? Does he hope to follow *2001* with more films? Why has he chosen the remote island of Sri Lanka for his home? What is his attitude toward present trends in science fiction? Real space exploration? Colonies? The future?

Arthur C. Clarke

At A Turning Point In Paradise



Above: Arthur C. Clarke, Ray Bradbury, Walter Sullivan of the New York Times, Carl Sagan, and Dr. Bruce Murray, director of JPL, join in a discussion of the future of space exploration. Left: Arthur C. Clarke on the terrace of his home in Colombo, Sri Lanka. The radio dish was rigged to an orbiting satellite.



Many thanks to Tom Craven (Craven Films, NYC) for his kind generosity in opening his photo archives to us and supplying us with data on the various escapades of A.C. Clarke. Also, thanks to Scott Meredith, Clarke's literary agency.

By DAVID HOUSTON and the editors of FUTURE

One of the few truly great science-fact and science-fiction writers recently paid a visit to the offices of FUTURE. No event of lesser significance could have caused our undersized, overworked, but highly enthusiastic staff to quite literally drop everything. We crowded him in the conference room, our brains brimming with questions . . .

Dr. Arthur C. Clarke stretches out, his big frame comfortably slouched in an office chair, and rummages through his briefcase. "Let me show you something. I have a picture here that will really blow your minds!" The photograph he produces is of an ancient rock stairway leading straight up a steep mountain. The stairway seems infinitely high—reminiscent of the "Stairway to Heaven" in the British fantasy film.

"I climbed it once," Clarke says almost proudly. "Jeremy Benson of the *New Yorker* dragged me to the top in 1969. That's *some* stairway. Perched on its summit is a tiny temple, and every year thousands of pilgrims make the ascent up what must be the longest stairway in the world. My legs were paralyzed for the next three days. But it was worth it, for at dawn I saw the spectacle for which the peak is famous. As the sun rose, the perfectly triangular shadow of the mountain was cast on the clouds below—stretching for perhaps fifty kilometers into the west." He

gestures toward the photograph. "That is the key of my next novel, *The Fountains Of Paradise*. I've written half of it now, and I need to get back and finish it." (The stairway is a mere 100 miles or so from Clarke's home.)

Then it isn't true that you're giving up writing?

"This is the last book, I hope. I've said everything I want to. For the first time, I have nothing more to say. *The Fountains Of Paradise* sort of encapsulates everything I want to say."

What's it about?

"The novel takes place in Sri Lanka 2000 years ago, when all of this [the stairway] was being built—and 200 years in the future."

Did the people 2000 years ago come from another planet?

"No!"

We look at each other dejectedly. But can he really mean that this is to be his *last* book? Arthur appears quite adamant about it and then says, "Well maybe in another ten years."

We heard something about a tax bout you were having with the Sri Lanka government. Was that—?

"No tax bout. On the contrary, they passed a law so I can live there tax-free. It's generally called The Clarke Act. It applies to a certain category of resident guests who, if they bring in a sufficient amount of foreign exchange, can live there tax-free. I'm really on very good terms with the government." He extracts another photograph. "There.



Above: 2001 is not the last of Clarke's books-into-films. Right: Clarke visited the offices of FUTURE for this interview.

That's one of the reasons I can't leave Sri Lanka." The picture is of a very cuddly monkey perched atop an electric typewriter.

Why did you choose to live in Sri Lanka?

"Read the new book; *The View From Serendip* contains a whole chapter in which I try to find the psychological answers to that."

Clarke's new book (published by Random House) contains his first autobiographical writing: short essays that connect many previously unpublished (or published in odd places) papers and articles. From that book, here is a passage that intimates why one of the world's most eloquent visionaries, why a man born and raised in a damp blustery England, feels at home in the tropics:

"It takes a long time to see the obvious, and in this case perhaps there was some excuse. After all, there was little apparent similarity between dull and gray English sea and turquoise Indian Ocean; between boardinghouses, Butlin camp, railway station—and an unbroken wall of closely packed coconut palms.

"One day, after a lecture somewhere in the American Midwest, a young lady asked me just *why* I liked Ceylon [the name for Sri Lanka prior to 1972]. I was about to switch on the sound track I had played a hundred times before, when suddenly I saw those two beaches, both so far away. Do not ask me why it happened then; but in that moment of double vision, I knew the truth.



Photo: David Hutchison

"The drab, chill northern beach on which I had so often shivered through an English summer was merely a pale reflection of an ultimate and long-unsuspected beauty. Like the three princes of Serendip, I had found far more than I was seeking—in Serendip itself. Ten thousand kilometers from the place where I was born, I had come home." (Serendip is an ancient name for Sri Lanka—and the source of our word: *serendipity*.)

Dr. Clarke adds:

"Whenever I see its coastline fall below my departing jet, I feel I have left some essential element of my soul behind me."

His ever-ready sense of humor surfaces as he stresses his intention to confine himself pretty much to his primitive paradise:

"Now I'll only leave Sri Lanka for two reasons. I'll go to Stockholm for my first Nobel Prize—they must mail me the second one—and for a seat on the Space Shuttle."

Seriously? Do you expect to take a ride on the Shuttle?

"I'm half serious about it. The Shuttle should be making routine flights in about five years. So what the hell—I'll only be 65."

If you've given up writing books, will you consider writing for films?

"Oh heaven forbid. I've got four books being filmed, or nearly, right now. *Rendezvous With Rama* has been sold for filming; *A Fall Of Moondust* has just been sold; *Dolphin Island* is going into production; and I'm happy to say the option of *Childhood's End* ran out at the end of last year, and I think

something can be done with it now."

Do you have any control over the filming of Rama?

"I don't even remember who's bought it. I hope that one day it will come to Sri Lanka and I'll get to see it. Making a film is such a chore! Years and years of toil. I just want to sit in the sun, play with my monkey, and enjoy myself with my Number 10 Meccano Set. Americans don't know what that is. It's like an erector set, but much better—the original. And I'm getting a small computer of some kind."

Will there be a movie of Imperial Earth?

"Perhaps, but I suspect the book is too cerebral."

Would you never even want to sit around and watch a film happen?

"Not unless it were to be filmed in Sri Lanka. And that's not impossible. I first conceived of *Fountains Of Paradise* as a film, as a matter of fact, using actual locales there." Ceylon has always been a popular place for film making. Dr. Clarke mentions "the blazing finale of *Elephant Walk*." He believes "the best film made in the country is still *The Bridge On The River Kwai*. If you want a vicarious trip to Ceylon, revisit David Lean's masterpiece next time it comes around."

Was the making of 2001 such an unpleasant chore?

Dr. Clarke recalls the "fateful letter" from Stanley Kubrick which began: "For some time I have been interested in making the proverbial good science-fiction movie . . ." Clarke explains: "At the time of 2001 it was particularly grueling because I hadn't quite got settled down in Sri Lanka, as I have now . . . with a large extended family to look after. I'm the sole support of about fifty people. Not to mention two German shepherds and one monkey. The mongeese have both escaped, so now they can fend for themselves."

Dr. Clarke, like many British and American expatriates living in tropical



Polonnaruwa, the "most holy of holy cities in Asia," served as a monumental background for the AT&T "Comments on Communications" series of short spots.

"underdeveloped" countries, enjoys the enviable advantage of almost limitless cheap domestic help. The autobiographical *Serendip*, in a chapter called "Servant Problem—Oriental Style," he dispels any hint of racism in a footnote: "Let me point out that the employment situation described is almost totally unrelated to race, but only to ability, education, and of course luck (or Karma . . .). Anyone who has read my fiction (especially *Childhood's End* or the short story *Reunion*) will know my views on racism. Nor am I ashamed of the fact that, in a country where the unemployment figure approaches 25 percent, I directly support at least fifty people, many of whom might otherwise be literally starving."

The people of Sri Lanka and India are of great concern to Dr. Clarke. He has

guided into being an educational satellite, ATS-6, which, for a time, beamed its cargo of knowledge down on developing Sri Lanka. One of the few owners of a television set in the country, Clarke invited crowds to his home to view the programs. In an article, "Schoolmaster Satellite," he explained:

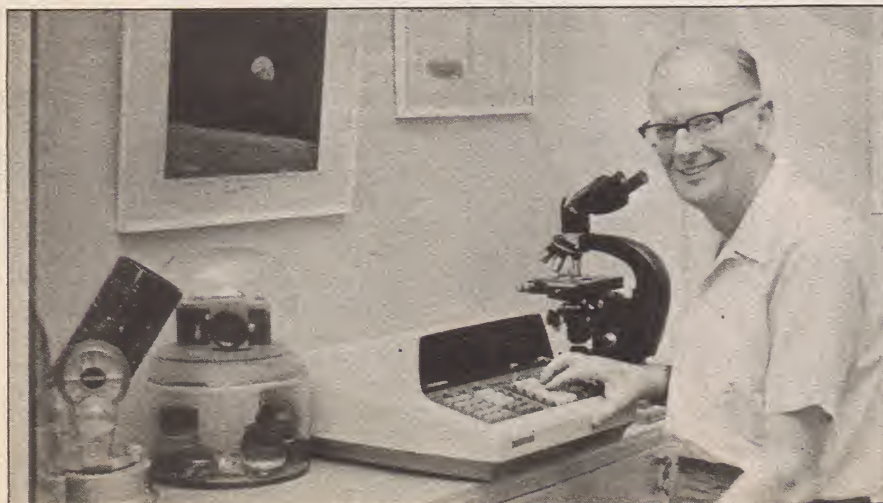
"Those who actually live in the East, and know its problems, are in the best position to appreciate what cheap and high-quality communications could do to improve standards of living and restore social inequities. Illiteracy, ignorance and superstition are not merely the results of poverty—they are part of its cause, forming a self-perpetuating system which has lasted for centuries, and which cannot be changed without fundamental advances in education."

He lifts another picture from his briefcase. "Here, this is my home; and that's my ground station." The picture shows a rooftop installation of a fair-sized dish antenna. "Of course it's not working now, because the satellite's been moved. ATS-6 is now doing the same kind of thing for the Eskimos." Clarke believes the condition of the entire "third world" will change radically as soon as the ATS-6 program moves out of the experimental stage. "I still have a TV—but only for video cassettes."

Do you get movies? Do you have your own projection equipment?

"Yes, 16 millimeter. The other night we had *Jaws* and *Godfather II*. Incidentally, I've heard that an 8 millimeter edition of parts of *Star Wars* is available. Not pirated, of course. Do you know where I can get it?"

A nearby camera store is named.



Arthur C. Clarke "relaxing" at home with the tools of his trade: binocular microscope, desk-top minicomputer, camera, lenses and astronomical telescope.



Top: Arthur C. Clarke in the clean room at Grumman's. Above: In 1974, Arthur Clarke was invited to speak before the House Committee on Space and Science.

Have you seen Star Wars? What did you think of it?

"I thoroughly enjoyed it. Much more the second time, when I saw it in 70 millimeter and in stereo. Of its genre, it's superb."

You didn't find things like noise in space bothersome?

"Not at all. It's a convention—just like the music."

Hear, hear!

"We didn't do that in 2001 because we could best get our effects with silence. But we didn't have space battles. I suppose you could fault *Star Wars*, technically, on thousands of levels—like saying 'parsec' instead of 'second,' which I didn't even hear the first time, actually. But I don't think any of the technical considerations are serious. You could also fault it on economic grounds: I don't think those robot scrap dealers could make very much of a living prowling around on the desert just waiting for the occasional robot that happened to be wandering along."

We asked you that because Analog is calling The Spy Who Loved Me the year's best science-fiction film—because of the technical errors in Star Wars.

"Well, I suppose *The Spy Who Loved Me* has a science-fiction style, but there's nothing in it which doesn't already exist. It's hardly fair to call it science fiction."

Dr. Clarke has not yet seen the other big film of the year, *Close Encounters Of The Third Kind*, but to our mention of Columbia's repeated postponements of press previews and premiere, he laughs and says:

"Oh, the same thing happened with 2001. I don't think it means anything."

Do you think science fiction is finally coming of age? Or is what we are seeing today just a passing trend?

"There have been many golden ages, of course, but up to now, they've all been only 12-carat."

Why has the genre become so popular?

"The young today are looking to expand their minds, and good science fiction is the *only* genuine consciousness-expanding drug there is."

Of all the current writers of science fiction—more than at any other time in history—Clarke believes that "ten of them are damned good." He tantalizes: "Incidentally, there was a three-cornered phone conversation the other day that you'd probably like to have overheard. Asimov-Heinlein-Clarke."

You didn't tape it?!

"No. Oh, it was very interesting. 'Have you received my tea okay?' 'Yes . . .'"

Surely one of the friendliest literary "feuds" is that between Clarke and Asimov. The dedication in Clarke's *Report On Planet Three* reads: "In ac-

cordance with the terms of the Clarke-Asimov Treaty, the second-best science-fiction writer dedicates this book to the second-best science-fiction writer." In *Serendip* there appears an introduction of Asimov, by Clarke, at a meeting in London. In it, Clarke referred to the above-mentioned Treaty and commented further: "On the whole, I've kept up my side of the Treaty—though sometimes I have to confess that there's a better man than either of us sitting up there behind his hippie-proof chain fence in Santa Cruz. Do you realize, Isaac, that *at this very minute*, while we're wasting time here, Bob Heinlein is racing away at a thousand words an hour?"

After thoroughly "roasting" Asimov before turning the podium over to him, Clarke listened to the following in Asimov's opening remarks: "And I will tell you now, that from here on in, I won't even mention him [Clarke] at all. Let us instead talk about science fiction, which, after all, is what we both do—I because I am a *great* writer, and Arthur because he is a *stubborn* writer."

For someone dedicated to basking in the tropical Sun . . . uh, how did you talk yourself into making this trip to America (One of us was really upset at the idea of retiring Arthur Clarke, and kept touching on this subject.)

Right: Clarke with Werner von Braun at the Smithsonian. Below: Two giants: the model of New York City and Arthur Clarke.





vides diving equipment and tours in Sri Lanka.)

"I've just come from Prague, where the annual Space Conference took place; and there were four Russian cosmonauts and no astronauts, so when I have lunch with NASA administrators, I'll ask them . . . I mean, can't they afford to send *one* astronaut to Prague? There was an ex-astronaut there, Brian O'Leary. Gerard O'Neill was there too, in great form."

Are you a member of his L-5 Society?

"No. I don't join things."

What do you think of O'Neill's movement to get a space colony built?

"It's excellent, but it's a hundred years premature. I'm glad to see all the interest; I only hope it doesn't overreach itself and collapse. We won't be seeing this kind of thing until the 2050s. And any cost and time estimates now are just nonsense. If we can't build something conventional like the Concorde without a five-to-one cost overrun, and we can't build a city that works *on Earth*, then we're nowhere near ready to build one in space." Clarke steals an ominous look at his watch.

What is it going to take in terms of technological breakthroughs to make such a colony practical?

"Oh, I don't know. It will develop organically."

It's clear that we're keeping our visitor much longer than the time he had allotted; we know he has a luncheon appointment. But it's shamefully clear that each of us has the attitude: Well, that's *his* problem. We're all thinking fast to find questions to keep him with us as long as he's willing to stay.

May I ask you a couple of things about 2001?

He smiles slightly. "You know, I've written two ruddy books about it. What more is there to say? Next question."

Are you really ending your writing career?

"Oh now don't say *that*. Just say that I'm taking a long, long rest. If in five years' time I find that I've built up steam, I shall curse and go back to the typewriter. I just feel that I've earned time off for good behavior."

Packing away his papers and the photographs he shared with us, he said:

"I'll tell you the best story that came out of Prague. You know, there's a group of African countries trying to claim the geosynchronous orbit. One is Uganda incidentally; Amin marches into space. The joke is this: already there is a U.N. committee on The Peaceful Uses of Outer Space. Someone proposed that now there should be a committee on The Useful Pieces of Outer Space."

That's the end. All of us groaning and Dr. Clarke chuckling gleefully. One of the most brilliant men we've ever had the pleasure of meeting leaves us—with a bad pun. **E**

Photo: David Hutchison

Arthur C. Clarke relaxes at FUTURE .

"I'm in the U.S. to accept an award—which was a spinoff from my address at M.I.T. on 'The Second Century of the Telephone' last year—which led to the Bell System commercials* and to this award. One of the people behind the award is Dr. Land (inventor of the Polaroid camera)—whom I'm looking forward to seeing again. He's the only man in America, I said when I was at M.I.T., that I hadn't met and really wanted to meet. I did; I had breakfast with him at his apartment. Now, of

course, he's locked in combat with Kodak.

"Another thing I came back for is to address a Congressional body of about 50 Senators who are interested in space."

Do you keep up a relationship with the people at NASA?

"I'm having lunch with the new administrator on Tuesday, meeting all his top brass. I get a lot of feedback from them, and they drop in often. The last administrator came to Sri Lanka to visit; the poor guy was so sick we had to put him to bed. [Astronaut] Alan Bean was back last year, and Pete Conrad and his wife also came to do some diving." (A number of Clarke's books—fiction and non-fiction—derive from his oceanographic studies. He still owns partial interest in a company that pro-

* These 12 minutes of commercial time, filmed in Sri Lanka with Arthur Clarke as spokesman for the Bell System and AT&T, project the world of communications during the next hundred years. The ads first aired during the Bell special, *The Man in the Iron Mask*—January 17, 1977.

hardware

Some of the latest gadgets and innovations from inventors and manufacturers



Video Music

by Atari. Model C-240. Audio synchronized video synthesizer. Suggested retail price: \$55.00.

"Now you can see the music you hear," claims Atari, the company famous for their computers, electronic TV games and pinball machines. The *Video Music* is an electronic device that translates the audio signal from a stereo amplifier to a television video signal for your color (or black and white) TV set. The audio signal is displayed on the screen as a series of changing colors and patterns.

The unit requires only a screwdriver to make the connections to the antenna terminal of a TV set. Atari supplies a switch box that either feeds the Video Music signal directly to the TV or switches the Video Music out of the circuit

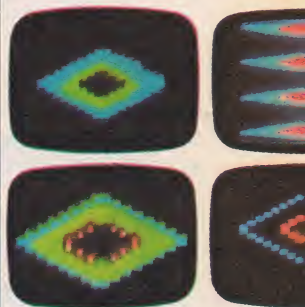
for normal TV viewing. The switch box has an adhesive backing for permanent installation to the back of your television set (if you so desire) and will not (so the directions say) impair normal television reception.

A two-channel shielded cable is provided to connect the Video Music to a receiver output, tape recorder output, pre-amp output, or other audio signal source. Most stereo systems have output jacks marked "Line Output", or "Tape Output," or a similar designation. These outputs are generally suitable for connection to the Video Music system. If these outputs are already in use, a "Y" or "T" adapter may be used.

The power plug may be connected either to a standard wall or one of the accessory outlets on the rear of the amplifier (assuming these outlets have not already been taken up by

assorted other stereo components) as the unit only consumes 6 watts of power.

A number of controls are provided on the front panel that vary the video display. The pair of dials at the upper left adjust the left and right gain respectively (image size), the center dial controls color, and the pair on the far right control the left and right channel con-



tour ("soft" shapes or "hard" geometric shapes).

Along the bottom of the front panel are thirteen push buttons. The first is the power switch and the remaining twelve select the display shape, the rate of change for the various patterns, number of patterns to appear, etc.

The principle of the color organ (colored lights synchronized with music) has been around for a long time—but nothing like the sophistication and versatility of this unit. Attractively styled to blend with stereo components, it measures in at 4" high, 14½" wide and 8½" deep.

Inventors and manufacturers are invited to submit items for inclusion in this column. Please forward all information to David Hutchison, Science Editor, FUTURE, 475 Park Ave. S., 8th floor, NY, NY 10016.



TouchControl Evaluation Kit

Model TCK 100 from American Microsystems, Inc., Santa Clara, CA. Suggested retail price: \$29.95.

For the advanced home hobbyist in electronics or product engineer, AMI is now offering the TCK-100 prototype kit. The kit may be used as-is to demonstrate the operation of *TouchControl* switches, or external logic systems may be connected through a cable directly to the chip outputs. Pre-drilled holes on the printed circuit board are provided for this purpose.

Though touch-switch technique is not new (elevators have used it for years), AMI has combined the touch switch with an integrated circuit (a MOS chip) to provide ultra-reliable, non-mechanical solid state control. It replaces mechanical push buttons, toggle switches and rotary switches with non-moving electronically sensitive touch

panels. Its initial application was engineered by AMI for the first electronically controlled oven and range combination marketed by a major manufacturer.

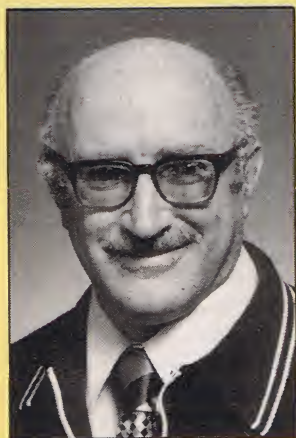
The kit includes the MOS chip (S9263) with a printed circuit board on which 16 *TouchControl* switches have been etched. The reverse side of the board contains all the printed circuitry necessary to interface with the touch switches and S9263. Each S9263 output is connected to an LED mounted on top of the circuit board to indicate which switches have been activated.

The TCK-100 is available from AMI distributors along with instructions for assembly and operation.

future.forum

Future Forum is designed to expose our readers to the thoughts of a variety of experts in the fields of science fact and science fiction. Each issue will pose a new question to our "guest panel" on a particular aspect of SF, space-age technology or future trends. This issue's question:

Should the future exploration of space rely on manned or unmanned probes?

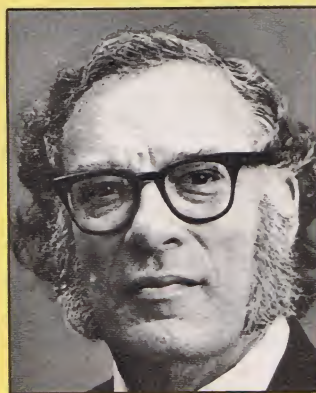


Dr. Geoffrey Canetti:

Head of the Space Division, Rockwell International.

I believe it will be a combination of the two. It is one of those situations where the best answer isn't A only or B only, but rather A plus B. The reason for this is that there are some aspects of space exploration which can technically be accomplished *only* through the use of unmanned probes. For instance, planetary exploration. We really don't have the technology developed to send men to planets and back again. So, in terms of planetary exploration, I do not see manned missions for the near future. However, I think that there is a 99.9% likelihood that Man will go to other planets within the next one hundred years. If you look at our history in the past, you will find that we have always underestimated what Man can do over a long period of time. Ten years ago, I would not have believed that we could have flown a reusable spacecraft. So there are things that man will obviously be able to participate in. Some don't make sense from an economic view, of course. We now use unmanned vehicles for communications satellites, making routine measurements of things out in space, etc. One area where man contributes enormously and where he

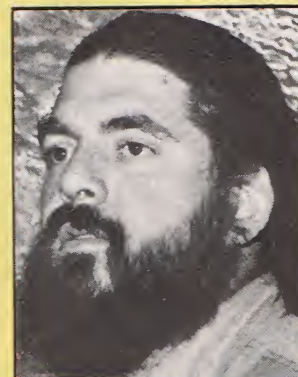
has always contributed enormously, is the stage where results must be evaluated as they arise. We must use man's ability to *understand* what's going on in space. I think this role will develop along with new techniques. I'm thinking especially of space lab activities, with totally new areas of endeavor, such as space processing. We need man there so he can make decisions until the techniques are evolved. Once the techniques have evolved, we can probably move to another area and follow unmanned supervision to begin.



Dr. Issac Asimov:

Hugo Award winning author, editor, scientist. Editor of *Issac Asimov's Science Fiction Magazine*

Future exploration of space should be done with *both* manned and unmanned probes. In the near future, unmanned probes are much the more feasible, for sending human beings out on many-month-long voyages to Mars, for instance, would be economically and psychologically difficult. Once we establish the shuttle as a working space vehicle, the expense of flights will drop and once we establish space settlements, the psychology of long trips will be less formidable. *Then* we can switch to manned probes, since as of now and for the foreseeable future, human beings are more versatile than machines.



Jonathan Eberhart:

Space Sciences Editor, *Science News*

It may not be a matter of "should," since it will happen *both* ways. The unmanned probes, at this point, are cheaper and they offer chances for science to perform a lot of tasks that financial realities prevent from being done any other way. However, the unmanned probes may suggest reasons why manned probes should be employed as a follow-up procedure. If all the unmanned missions go out and, given all the exciting things they've found so far, should they *not* find things that make it worthwhile for people to follow them up . . . I will be very much surprised.



Gerry Anderson:

Television and film producer, creator of *Space: 1999*, *UFO*, *Supercar*, *Thunderbirds*.

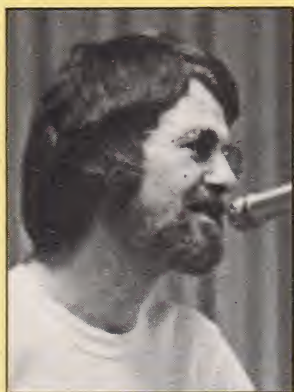
The American journey to the Moon was a perfect blueprint for exploration in the future. The probes went first and Man followed. Albeit that I have a healthy respect for the Russians, they have not put a man on the Moon, and for that reason their space program, in my view, cannot compare. Will we ever be satisfied with data alone? I doubt it.



Dr. Mark R. Chartrand:

Chairman, Hayden Planetarium

I think the best answer to that is "Let's keep our options open." I think you'd have to use a manned probe when you need rapid feedback and high data-gathering capability or when you need subjective impressions of what's going on. That would be in an instance similar to when the astronauts took over the controls and actually landed the LEM on the Moon—when their computer would have dumped them in a boulder field. Of course, there would be other missions where an unmanned probe would be most efficient. I'm thinking of something like sun-skimming probes or a Jupiter atmosphere probe. We'll conduct our space explorations in exactly the same manner we've learned with ocean exploration. You drop a piece of lead down there on a piece of long string first. Then, you see what happens. If it doesn't get bitten off—you send a man down there.



Andrew J. Offut:

President of the Science Fiction Writers of America Asc.

My first reaction comes from my son Jeff. He says that he hopes there will be all-manned probes because he has serious hopes about going into astronaut training. Aside from that, I would have to say that probably both types of missions will be used. The extent of Man's role will depend on what speed we will

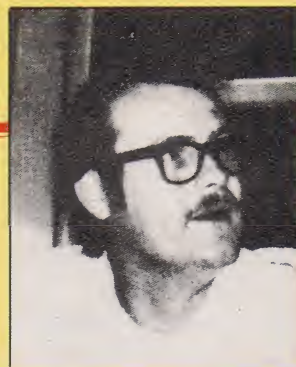
be able to attain in space. The human psyche will find long, long trips very difficult . . . particularly with no barnacles to scrape off, or sails to bend. Things will not be as lively on these exploratory voyages as they were with Columbus and Balboa. On the other hand, more than likely, we'll be able to attain greater speed in space *without* man aboard, presumably through the use of cybernetics. Supposedly, a cybernetic device can withstand a one or two hundred gravity. For you and me, that's not only unbearable, it's not feasible! Now, suppose we develop a robotic scanner well beyond what we have in existence now. Unmanned ships thus equipped could do our general exploring and relay reports back concerning various planetary surfaces, atmosphere, pressure and so forth. Human explorers would thus be saved the physical risk and could later use that information to further manned missions.



Carolyn Henson:

Editor of *L5 News*, the publication of the L5 Society—"An international organization working to make space settlements a reality by 1990."

I think we'll do it with unmanned probes, but it's more fun to send out people. People will always argue that there's that spark of creativity that only *people* can contribute to a situation. Currently, although I feel that some of the artificial intelligence organizations might debate me, even if you could get robot probes as smart as humans . . . just the fact that people love to explore (that Lewis and Clark instinct never dies out) will insure the fact that there will be some humans going out on some of these space probes.



Dr. Jerry Pournelle:

Former U.S. Space Program scientist, science editor of *Galaxy* magazine, winner of the first John W. Campbell Award, author of *The Mercenary*, *Birth Of Fire* and *High Justice*.

The controversy between the black box advocates and the man-in-space advocates has been raging for a number of years. I've always embraced the man-in-space position. I would have thought, in fact, that the experiences with Sky Lab would have made it almost self-evident as to the relative merits of the two sides. Sky Lab would have been totally useless were it not for the fact of human beings going up there and reassembling it, essentially. As you know, it didn't work as planned. But that's only the obvious advantage you can see from the television set. If you look at the scientific data, there was a great deal of what I can only call "target of opportunity scientific experiments," which took place from Sky Lab. Nobody would have thought of them in advance. Some of these had to do with what to look at on Earth; others had to do with large solar prominences and several things like that. The black box approach, however, is not one to be despised. I don't mean we shouldn't also send unmanned probes to the planets and so forth. But in the last analysis, a black box can only conduct an experiment that you've programmed in advance. If you haven't anticipated that capability, it simply won't be able to conduct the experiment. For example, if it turns out that by shifting the camera one centimeter more you will get three times as much as data, then that kind of thing will not be possible unless you have thought of it in advance. People, on the other hand, can re-program themselves and rebuild the whole system if necessary. It seems to me we ought to use the most versatile exploration vehicle there is: and the most versatile exploration device I know of is the human being—an intelligent one. It seems to me, that one reason for going into space is the trite phrase: "Because it's there." If we're not going there, then what's the point of going at all.



Below: One of the magnificent miniature sets constructed for *Things To Come*. The space cannon is loaded with its bullet ship.

The Shape of Things To Come





Above: Cabal and his Wings Over the World entourage. Left: In a test reel made for the film, Ernest Thesiger portrayed the futuristic conservative, Theotocopoulos.

By SCOT HOLTON and ED NAHA

Things To Come was a unique film experiment in every sense of the word. With a budget of over one million dollars, massive doses of intricate special effects and some of the finest actors ever to grace the screen, the motion picture was more than just a fictional glimpse of the future, it was a portent of *all* science-fiction spectacles to come, paving the way for many of the fine SF movies of the fifties and sixties.

The film was actually scripted by H.G. Wells, one of two screenplays he would write during his lifetime (the other being 1937's *The Man Who Could Work Miracles*). Audiences were finally given a visual glimpse of Wells' brave new worlds in a breathtaking manner dictated by the great visionary himself.

By the 1930s, Wells was regarded as an astonishing prophet of the 20th century. He displayed its wonders and horrors to his readers, leading them into an imaginative future world he confidently attributed to the coming of The Golden Age Of Science. By 1900, via his numerous novels, Wells had predicted television, transatlantic air flight, superhighways, air-conditioning, moving sidewalks and many other soon-to-be-realities. He foresaw a Utopia wrought and ruled by science. Although he felt this coming social order inevitable, he was determined to hasten its arrival by frenzied writing and intellectual pamphleteering.

Distressed by the war-ravaged reality surrounding him, Wells turned in his later years from fiction to non-fiction, producing such encyclopedic works as *The Outline Of History* (1919-1930); *The Science Of Life* (1929) and *The Work, Wealth and Happiness of Mankind* (1932). In 1933, he unleashed the sprawling *The Shape Of Things To Come*, a philosophic inquiry into the possibilities of the future intended as a companion piece to his recently revised *Outline Of History*.

The *Things To Come* novel took the form of a history of the future which, set down as if it had come to the author in a dream, is found in the personal effects of a deceased League of Nations official. Several elements in Wells' dreamlike narrative proved remarkably prophetic. World war breaks out in 1940, starting as a conflict over Poland, igniting Germany, Italy and the Balkan states. It is a war fought in the air with radio-controlled missile torpedoes leveling cities, with poison gas used in-



The last Cabal of *Things To Come*, Oswald (Raymond Massey), attempts to galvanize public opinion for an all-out space program. He finds the future less than Utopian.

Photos: © United Artists

discriminately. Battered by wave after wave of war, civilization crumbles and all forms of communication are wiped out. Petty leaders arise, whipping their village packs into acts of barbarism. A few aeroplanes (his spelling) remain despite the coming of this new dark age. They prove to be the only machines capable of uniting the fragments of this shattered world. It is the young airmen and remaining scientists and technicians who sweep away the rubble and build the "modern State." Wells' faith in science was undiminished.

The book was considered wild sensationalism and, much to Wells' chagrin, no one took his very specific predictions about the upcoming danger of Adolph Hitler and the possibility of a second World War very seriously. Nonetheless the book became a best-seller with Wells indulgently regarded as an amusing, outmoded intellectual, an artifact with a certain amount of prestige and tradition intact.

The Shape Of Things To Come did, however, make quite an impression on Alexander Korda, the great Hungarian film producer. He approached Wells with the suggestion that the author write the screenplay of it. Wells was intrigued and consented, throwing himself into every aspect of the production. He was well aware that screen SF of the thirties was, at best, a tentative proposition. With very few exceptions (two of which proved to be the Wells-inspired productions of *The Invisible Man* and *The Island Of Lost Souls*) movie science fiction was juvenile-oriented, *Flash Gordon*-esque swashbuckling; low on intellect, imagination and budget. Wells was determined that his first film be as finely crafted as his novels.

He dictated the moods of the film's music to its composer, Sir Arthur Bliss and even designed the futuristic costumes, noting that there would be "no costumes of cellophane illuminated by neon" in this production. While Wells had no difficulty in imagining the wonders to come, he apparently had great problems in writing the screenplay. It became obvious that the plotless speculations of his book could not be translated into a workable feature film. The first treatment was discarded and a second one was later completely rewritten. Wells wrote in new characters to every decade of his future chronicle and linked his chronology to three generations of a single family whom he named Cabal. Assisting Wells in writing the final draft was the Hungarian writer Lajos Biro, a long-time associate of Korda. Beginning as *The Shape Of Things To Come*, the script then mutated into *Whither Mankind* before finally emerging as simply *Things To Come*.

Briefly, the finished script concerns the future of mankind in three distinct periods. In 1936, a world war erupts in the city of Everytown. The poison gas

used in the fighting (mustard gas, by the way, was first introduced in World War I) evolves into a terrible plague called the Wandering Death. Carriers of the disease are shot on sight and, soon, mankind reverts to its basest nature. The world is populated by warlords and tribes fighting mini-wars to insure the sovereignty of their territories. In 1970, Everytown is startled by the arrival of John Cabal (Raymond Massey), a flyer who pilots a newly made aircraft.

The citizens of Everytown are astounded. In this primitive post-apocalyptic world, the flying of airships is a lost art. Surrounded by poverty, ruin and a total lack of modern appliances, the populace is taken aback when Cabal reveals the existence of *Wings Over The World*, a scientific assembly dedicated to rebuilding and restructuring society around the world. The Boss of Everytown (Ralph Richardson) is not impressed and has Cabal imprisoned. Everytown soon succumbs to the peaceful onslaught launched by *Wings Over The World* and, by 2036, the world is at peace and new technology thrives.

Still, there is unrest. Oswald Cabal, grandson of John, fights to accomplish a Moon launching while Passworthy, an offshoot of the Boss, attempts to halt the launch in a militaristic wave of conservatism. Science triumphs in the end and mankind enters the heavens. With a finished screenplay acceptable to both Wells and Korda in hand, the *Things To Come* crew suddenly found themselves faced with the task of visualizing the verbal wonderment of Wells.

Of major importance to the film was the brilliant American production designer William Cameron Menzies who, together with special-effects designer Ned Mann and settings designer Vincent Korda, created the fantastic Everytown for the year 2036—a futuristic metropolis rising from a war-ravaged dark age. Never before had the screen witnessed such brilliant special-effects work. Elaborate miniatures were mixed with split-screen

processes: actual lower structures of buildings and streets with people moving through them were matched with miniatures of the upper structures towering skyward. Motion pictures of moving crowds projected against tiny screens set up within complex miniatures, and crowds of tiny "people" moving on tracks across mini-streets gave the illusion of realism and panorama to the cities of the future.

Fred Chappell, a critic for the *Film Journal*, described the final cityscape this way: "... crowded straight-lined megacities with their enticing anthropomorphic inventions, light and shadow berserkly romantic in a feverishly clinical aura." Less dramatic in verbiage, but just as enthusiastic about the special effects, were the technicians who worked round the clock to create both the futuristic cities and aircraft.

"It was a wonderful experience," recalls special effects expert Wally Veevers, who cut his professional teeth on the hanging miniatures used for the film. "We worked day and night on the picture. On one occasion, I worked a whole week without stopping even to sleep. But those were wonderful times. I used to work for one group of people during the days and during the nights for a different lot because I was so interested in special effects. But Ned Mann never used to do anything until after six o'clock in the evening. He wouldn't start work until the bosses had left. As a result we often didn't finish until about four in the morning. But we had to report at 8:30 every morning no matter what time we finished."

The jutting masses and horizontal lines of the miniature and full-sized sets dominate the design, action and ultimately the film. The sets for Everytown, 1940, 1970 and 2036 provide a structural core for the film. London's Oxford Circus is first seen as a bustling shopping center at Christmastime. Thirty years later, it's in ruins. Finally, the city of the future rises phoenix-like from its ashes.

The London of 2036 is seen as an airy, roomy, underground metropolis—below the landscaped walks and hills of the surface world where the original city once stood in decay. The camera swoops down beneath a vast circular opening onto a great square of many-tiered dwellings, terraces with trees and shrubs, with ramps and elevators shooting up transparent tubular shafts. There is always sunlight, and the air is so pure that respiratory diseases are a thing of the past. The new society is ruled over by *Wings Over The World*—the "brotherhood of efficiency and the freemasons of science."

Wells had his own distinct notions on the shape of London's future and noted that "things, structures in general, will be great, yes, but they will not be monstrous. Men will not be reduced to

THINGS TO COME CAST AND CREDITS

THINGS TO COME: A United Artists Release. 1936. 130 minutes. Produced by Alexander Korda. Directed by William Cameron Menzies. Screenplay by H.G. Wells from his novel *The Shape Of Things To Come*. Art Direction by Vincent Korda. Cinematography by George Perinal. Music by Arthur Bliss. Special Effects Cinematography by Edward Cohen and Harry Zech. Special Effects by Ned Mann. Edited by Charles Crichton.

John/Oswald Cabal ... **Raymond Massey**
The Boss ... **Ralph Richardson**
Theotocopoulos ... **Cedric Hardwicke**

Supporting cast: Margaretta Scott, Edward Chapman, Sophie Stewart, Maurice Bradell, Ann Todd, Pearl Argyle, Kenneth Villiers, Pickles Livingston, John Clements, Allan Jeayes, Ivan Brandt, Anthony Hollies, Derrick de Marney.

servitude and uniformity, they will be released to freedom and variety. All the balderdash one finds in films such as Fritz Lang's *Metropolis* about 'robot workers' should be cleared out of your minds before you work on this film. As a general rule, you may take it that whatever Lang did on *Metropolis* is the exact contrary of what we want done here." Indeed, as it turned out, nearly everything about the film was contrary to the norm for screen science-fiction . . . a fact which both delighted and disappointed moviegoers.

Wells' sense of sociology virtually overwhelms *Things To Come*, giving it a stilted, dreamlike quality that occasionally undermines the action. Essentially, Wells' technocratic views of social development seemed superficial and, even in 1936, were considered outmoded. Many of the ideas incorporated into the film mirrored the dogmatic scientific socialism of his written work and some audiences found it tough to handle. Much of the dialogue in the film is the thinly disguised voice of Wells expounding upon the rise of militarism, fascism and other variants of authoritarianism of his day.

Commenting on the changes made on the story during the transition from book to film, Wells said: "The book on which this story rests is essentially an imaginative discussion of social and political forces and possibilities, and a film is no place for an argument."

Ralph Richardson's The Boss of 1970 expresses the anti-intellectual nationalism of the 30s. "They don't print books anymore," he sneers. "Who wants books to muddle our thoughts? Why is all this science ever allowed?" Science—the product of a free mind—is shown as always presenting a threat to the power of the State. If the State cannot preserve its control over science, then it will try to destroy it. Raymond Massey's Cabal is Wells' primary spokesman. In the 1940 Everytown he asks his wife: "Why should we surrender life to the brutes and fools?" Older and firmer in his thinking in 1970, he declares "We don't approve of independent sovereign states. We mean to stop them. The warlike state has to vanish, like the tyrannosaurus and the saber-toothed tiger."

The final confrontation between the two sides occurs in Everytown 2036. Cabal's grandson is the leader of the Moon launch project. But once again, progress is threatened by a resurgent group of reactionaries who want a return to the days when life was "short, hot and merry." Cabal's answer to the mob is, "We have a right to do what we like with our lives." The mob's leader responds, "We'll hate you more if you succeed than if you fail. We don't want to live in the same world with you. Destroy the space-gun!"

Inevitably, Wells' optimistic, rational



Cabal, in reality the voice of Wells himself, points to the heavens. "All the universe—or nothing. Which shall it be?"

philosophy allows the Moon craft to be launched and Man is freed to continue his progress to wherever it will take him. The final hope of *Things To Come* is Wells' personal view crystallized in a classic scene between Cabal and Everytown's average citizen, Passworthy. Here is an excerpt from the final shooting script:

An observatory at a high point above Everytown. A telescopic mirror of the night sky is showing the cylinder as a very small speck against a starry background. Cabal and Passworthy stand before this mirror.

Passworthy: I feel—what we have done—is monstrous.

Cabal: What they have done is magnificent.

Passworthy: Will they return?

Cabal: Yes. And go again. And again—until the landing can be made and the Moon is conquered. This is only a beginning.

Passworthy: And if they don't return—my son, and your daughter? What of that, Cabal.

Cabal: (with a catch in his voice but resolute) Then presently—others will go.

Passworthy: My God! Is there never to be an age of happiness? Is there never to be rest?

Cabal: Rest enough for the individual man. Too much of it and too soon, and we call it death. But for MAN no rest and no ending. He must go on—conquest beyond conquest. This little planet and its winds and ways, and all the laws of mind and matter that restrain him. Then the planets about him, and at last out across immensity to the stars. And when he has conquered all the depths of space and all the mysteries of time—still he will be beginning.

Passworthy: But we are such little creatures. Poor humanity. So fragile—so weak.

Cabal: Little animals, eh?

Passworthy: Little animals.

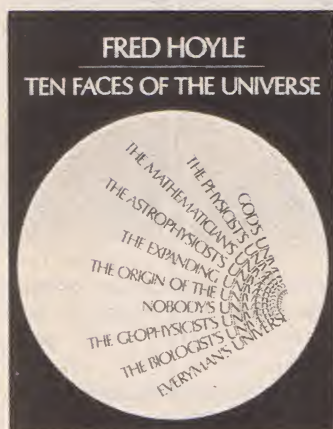
Cabal: If we are no more than animals—we must snatch at our little scraps of happiness and live and suffer and pass, mattering no more—than all the other animals do—or have done. (He points out at the stars). Is it that—or this? All the universe—or nothing. Which shall it be, Passworthy? WHICH SHALL IT BE?*

*©The Estate of H.G. Wells

The two men fade from the camera's eye, in Wells' final scene, and as the music rises, the eternal question "Which shall it be?" reverberates throughout the heavens, ending the film on a positive, hopeful note.

When *Things To Come* was released, the critics were stunned. It was generally well received with most of the laudatory comments going to Menzies and the film's artistic stylization. Dialogue, script idiosyncracies and character development were largely panned, effectively castrating Wells' overt philosophizing. *Weekly Variety* reported on March 4, 1936 that "Dialogue is intolerably bad. Characters make long meaningless speeches. At the final fade-out, one who has already had far too much to say is still speech-making about humanity and the future of invention." Most critics echoed those views. The most outraged criticism came from the traumatized British Interplanetary Society which, in its *Journal* of February 1937, positively railed at Wells' conducting a Moon shot using a Jules Vernian space cannon. "... It is up to the writers . . . to make sure their facts are reasonably accurate and not to give the public the idea that modern astronomical societies resemble the [Verne's] Baltimore Gun Club. Play the game, Mr. Wells!"

Happily enough, *Things To Come* managed to weather its controversial release, causing publications such as *Variety* to admit "William Cameron Menzies' direction, lavishness of treatment and decor, and skillful mixture of illusionary devices of expert camera tricks and sound necromancy surpasses in scope anything which has yet come from Hollywood." Despite its flaws, *Things To Come* was a cinematic experiment that inspired awe in both its critics and fans. Today, some forty years after its release, it stands as a monumental milestone in SF movie making. It is no wonder that many present day film aficionados regard *Things To Come* as the 2001 of its day.



Ten Faces Of The Universe, by Fred Hoyle.
(\$6.95 in oversize paperback from W.H. Freeman and Co.)

Fred Hoyle, astronomer, cosmologist, and science-fiction author, has written *Ten Faces Of The Universe* in order to propose a science of *being*. Though the book may prove a bit esoteric for some readers (Hoyle is an academician, after all), for others it will be a major adventure. Through a veil of pontification, and with a definite axe to grind, Hoyle wrestles with a bedrock question of both science and philosophy: what is the origin of our universe?

Hoyle proposes ten ways of understanding the cosmos, and begins with "God's Universe"—the theologian's way—in order to dismiss it entirely. To stir the anticlerical ashes, Hoyle suggests that men of the cloth learn to speak of God in mathematical terms ($=mc^2$), and forego any conclusion that cannot be expressed as an equation. The terms of the quest are set: the language we speak must be objective. This will no doubt comfort the descendents of all the astronomers and early physicists who were burned at the stake for speaking what was, at root, a taboo tongue.

Chapters on "The Physicist's" and "The Mathematician's" Universes lay out the complex logistics of particle physics in layman's terms, and handle the notions of 4-dimensional spacetime, relativity, *quarks*, and quantum mechanics in a way that will intrigue readers of science-fiction. These are ideas that have stood men of science on their collective heads over the past 2 decades, but Hoyle leaves the reader standing on his feet, ready to deal with even more complex data in the future.

Hoyle gives the uninitiated a frame of reference.

Hoyle goes on, in following sections, to touch on "The Astrophysicist's Universe" (the atoms which make up the stars, how stars are born), and the voyage outward is launched. Galaxies, *quasars* (the most distant objects visible with a large telescope), future-time, terrestrial and E-T geophysics, and energy fusion all pass by Hoyle's lens. What's more, the information is all handled with great logic and, to tax another new notion, *charm*. However, the book ends, enigmatically, with a discussion of earthly energy and over-population problems, which, though timely, is out of place. Hoyle had set the stage for a far more dramatic conclusion. Bring on the space colonies? No, not exactly.

Hoyle's investigation is organized, loosely, around the idea that the universe is scribed by man, and that man stands midway between an inner and an outer galaxy. The limits of the inner are approached through the electron microscope (not through the soul, *Mahareeshi*), the outer through the radio telescope, and the space probe. When one speaks of either universe, according to Hoyle, one uses mathematical terms, but one is forced to ask the good doctor why he omits *imagination* as another equally valuable language? Because the imagination resists forming itself into an equation?

Also sadly lacking from Hoyle's book is any discussion of the controversy that has rocked Cosmology over the past 10 years: Big-Bang vs. steady-state origin theory. Hoyle, notoriously and unfashionably, is a steady-stater and, I suspect, does not mention The Big Bang for sectarian reasons. On this question, Hoyle is rapidly becoming a one-member sect. And, unfortunately for the reader, The Big Bang is perhaps the most interesting idea currently making the theoretical rounds among cosmologists.

But Hoyle grinds the axe of steady-statism with great precision and style. *Ten Faces Of The Universe* will make a fascinating introduction to any reader eager to begin an investigation into the further regions of cosmology. Provided, of course, that one bears in mind that 10 is an exceedingly small number if one is pressed to come up with a list of all the different approaches humanity has developed to reach to the cosmos.

—James C. Odell



Colonies In Space/The Next Giant Step

(\$8.95 in hardcover from Harcourt Brace Jovanovich, Inc.)

Frederic Golden is Science Editor as well as Associate Editor of *Time* Magazine. He possesses that wonderful ability, a la Asimov and Clarke, to explain the most complicated of scientific and theoretical concepts in simple, lay terms. His last book, *Quasars, Pulsars and Black Holes*, is a perfect example of this. In *Colonies In Space*, Mr. Golden has tackled a subject that obviously fires his imagination and lifts his spirit. At first a "non-believer," Golden was brought into the space colonization fold through conversations with its leading scientific proponent—Gerard K. O'Neill. He is now firmly convinced of the necessity and naturalness of Man living in space habitats.

Colonies starts with "A Space Colonist's Journal"—the diary of a newly arrived member of *Beta Colony*, which orbits the Earth at L5. The scenario is of a typical space habitat, circa 2030. After presenting this idealized version of "how it could be," Golden brings the reader back to Earth with a point-by-point survey of the concrete steps already taken by Man in establishing his place in space.

One of the most fascinating parts of the book is an explanation of why it is not only feasible but *practical* to look to Earth-orbit as the next logical place for human expansion. Mr. Golden also presents the clearest picture yet of what exactly the L5 orbit is, its historical background and natural advantages.

The only place that the book breaks down is in its objectivity. Golden appears to have really been smitten by O'Neill's ideas and ideals. Some of the more serious problems with realizing an L5 colony are glossed over; others are treated lightly or not at all. Still, the "how-to" information is all there, and *Colonies In Space* stands as the clearest and most readable volume yet published on the subject.

Howard Zimmerman

JEWELRY OF THE THIRD KIND

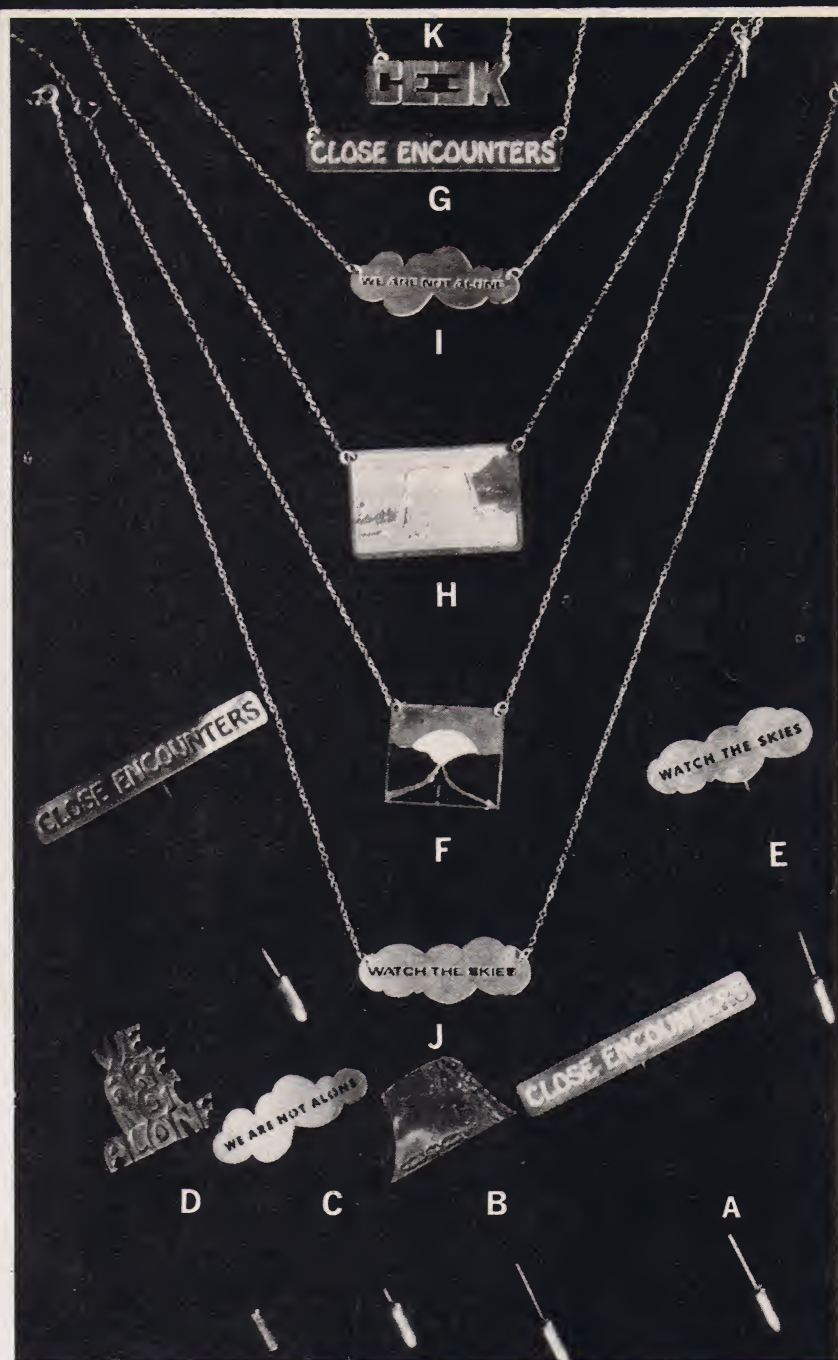
A beautiful, unique collection of sterling silver, and silver with 24kt. gold-inlay stick-pins and necklaces created by a well-known jewelry manufacturer. Be the first in your crowd to add a new dimension to your clothes by accessorizing in "Close Encounters of the Third Kind" jewelry.

STICK-PINS

- A. Close Encounters — Wear the words Close Encounters on a stick-pin and maybe you'll have your own close encounter. Comes in sterling silver, or silver with 24kt gold-inlay.
- B. Devil's Tower — Let the image of the Devil's Tower stay with you while you wear it on a jacket, scarf or sweater. Available in sterling silver or silver with 24kt. gold-inlay.
- C. We Are Not Alone — You won't be alone for long when wearing this stick pin made of sterling silver or silver with 24kt. gold-inlay.
- D. We Are Not Alone (Clouds) — No, your head is not in the clouds — everyone will be tuned in on your message in sterling silver.
- E. Watch The Skies (Clouds) — Everyone will be watching the skies along with you. Display your message in sterling silver.

NECKLACES

- F. Enameled Road — Take to the road for a close encounter with an enameled-finished necklace on a sterling silver 16" chain.
- G. Close Encounters — Have an encounter of the 1st, 2nd or 3rd kind while wearing this message in either sterling silver or silver with 24kt. gold-inlay on a sterling silver 16" chain.
- H. Devil's Tower — Wear the infamous Devil's Tower on a beautiful 16", sterling silver chain. The Devil's Tower is only available in silver with 24kt gold-inlay.
- I. We Are Not Alone (Clouds) — You'll have everyone looking around to check out your message when you wear this sterling silver necklace on a sterling silver 16" chain.
- J. Watch The Skies (Clouds) — Great conversational piece to start your own close encounter in sterling silver on sterling silver 16" chain.
- K. CE3K — Only you will know what's happening when you wear these initials of "Close Encounters of the Third Kind" in sterling silver on a 16" sterling silver chain.



Mail To: **STARLOG/FUTURE MAGAZINE JEWELRY**
475 Park Avenue South
New York, NY 10016

Please rush me the following at only \$9.95 each plus \$1 for postage & handling for each item ordered.

STICK-PINS

- A. ☐ Close Encounters ☐ Sterling Silver ☐ 24Kt Gold-inlay
- B. ☐ Devil's Tower ☐ Sterling Silver ☐ 24Kt Gold-inlay
- C. ☐ We Are Not Alone ☐ Sterling Silver ☐ 24Kt Gold-inlay
- D. ☐ We Are Not Alone (Clouds)
- E. ☐ Watch The Skies (Clouds)

NECKLACES

- F. ☐ Enameled Road
- G. ☐ Close Encounters ☐ Sterling Silver ☐ 24Kt Gold-inlay
- H. ☐ Devil's Tower
- I. ☐ We Are Not Alone (Clouds)
- J. ☐ Watch The Skies (Clouds)
- K. ☐ CE3K

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*sf*graphics

Each issue of FUTURE will examine the world of advertising and promotional graphics. The talented people who sell science-fiction to the public by adding reality and excitement to numerous products have remained invisible for long enough. Their work will find a proper showcase in this regular feature.

By RICHARD MEYERS

Bulbous alien creatures argue over the possession of a powdered drink mix. An astronaut hysterically declares that his lost box of candy is more than just an oral fixation. A silver-garbed superwoman aides a superman between declarations on her life insurance's qualities. What is it all about? Another day at the *Star Wars* cantina? *Close Encounters* of a Weird Kind?

Not quite, but close enough. These are merely examples of the lengths advertisers will go to take advantage of the biggest public attraction since Farrah Fawcett-Majors. Although Tang Breakfast Drink has long been featuring their animated Moon creatures and participation with the Apollo flights in commercials, it is only recently that the

New York Life ad graphic shows agent prepared to deal with off-planet client.



likes of Chicklets and New York Life Insurance have incorporated science-fiction themes into their advertising campaigns.

And they are not alone. All over the country, in video, radio, and print, businessmen and advertisers have realized that the audience for SF is more than eight-year olds on an allowance. The two recent genre blockbusters have

proven that the market includes big people with big bucks. And the advertisers are reacting.

Among the "high class" and high-priced items being marketed with high imagination are Westinghouse refrigerators, being hawked by an articulate R2-D2; Toyota's new Celica which appears floating across a star bed; and Marantz Stereos, whose ad graphics consist of dive-bombing through their stereo components in a computer-graphic style reminiscent of the X-Wing attack on the *Death Star*.

No media outlet is immune. Flipping through a favorite magazine, one's eye might be caught by the quiet vision of a half Moon floating in a sea of stars. The legend inscribed beneath? "There may still be places where Grand Marnier isn't offered after dinner."

Perhaps the most striking and surprising of the in-print SF ads is for Lark Luggage, a New York-based company known for their high quality and stylish design. Why should such a concern consider using futuristic space craft and alien landscapes as the foundation of a publicity campaign aimed at the upper-middle class? Marlys Sherman of the March Advertising Agency shed some light on the subject in a recent letter to these offices.

"Luggage in a travel situation is a natural visual for an ad," she begins. "But travel has become so familiar to so many that foreign locations like Paris, Rome, or London don't capture people's imaginations the way they used to."

"When *Star Wars* opened as such a success," Ms. Sherman elaborates, "we saw a way to use a travel situation again. People still dream about going places. What we needed was an extraterrestrial location that would inspire the kinds of fantasies London and Paris used to inspire."

Joseph Y. Pelavin, the head of Lark, admitted that he was, at first, hesitant about letting March use the futuristic concept, but the personal reactions and sales reports have gone a long way in quelling his doubts.

These doubts are common among the growing number of major American firms who have produced or are in the stages of planning *Star Wars* or *CE3K*-related ad campaigns. The widest floodgate toward this end was opened by the Ford Motor Company, whose Futura car commercials, in print and on film, are not only attractive, but mini-epics of special effects as well.

"A number of pieces fell into place at the right time for us," said Lyle Greenfield, the architect of the ad for the J. Walter Thompson Agency. "About the time we learned Ford was putting out a car called the Futura with somewhat advanced styling, *Star Wars* was in full bloom in terms of a national phenomena and reports were that there was more to come. Really, we were just seizing a unique opportunity here."

But the advertising organization's creative department did not trust their instincts alone. In order to make sure of the concept's viability and help assuage the fears at Ford, they researched the SF theme.

"There wasn't much we had in additional concepts," admitted Greenfield, "that were really effective in portraying this car in a stylized, romantic, fairly exciting way. The others bit the dust in the research. People were highly receptive to the idea of using space, futurism, and science-fiction in a fairly 'light fantastic' vein as an image."

The final decision was helped tremendously by the car itself; the name Futura was revived from the '50s and Ford's Falcon Futura.

"It may not make sense to see an Acme Sewing Machine floating through space," explained Greenfield, commenting on the more recent SF "bandwagon-jumpers . . . But if you have a car, which is a vehicle of transportation and you're claiming it has some advanced design properties, and the car's name just happens to be Futura, you're missing an opportunity if you *don't* do it."

So the ads were produced at no little expense, comparing the sleek automobile with an even sleeker silver-winged spacecraft which loomed just beyond the stationary car in the magazine ads but zoomed about in the TV spots.

"The ship is a model, obviously," laughed Greenfield. "It did not land mysteriously on out set and then we decided to make a commercial."

Ford introduces FUTURA

Although we planned to tell the press, "we don't know how it got there . . .!"

In reality the ship was made up of plywood, fiberglass, metal, and plexiglass, all buffed, then painted a highly metallic silver. According to Mr. Greenfield, after a "fairly significant" display of lights was installed, the construction measured 30 feet from wingtip to wingtip. The ad man then went on to detail the technical components which made up the unusual commercials.

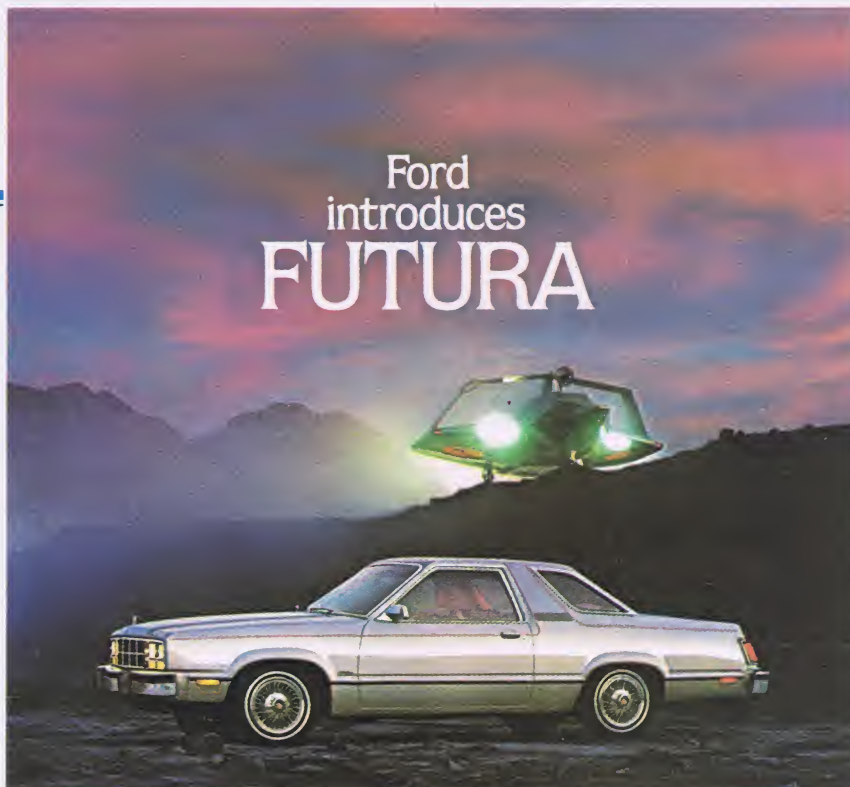
"We hired a special effects company and used an enormous fifty foot (front projection) screen on the MGM lot to achieve the effect of the car driving across a 'fantastic planet,' so to speak, with a really stunningly done star-field. At the very end, the spaceship, which had been 'knocked down' in artwork, takes off over the car. About fifty percent was shot live in the desert about a half an hour outside Palm Springs."

Did all the work and expense pay off, in the ad agency's reckoning?

"I think it definitely has," answered Greenfield. "There's unanimous excitement at Ford, and I include the President of the company on down. That's fairly unusual because there's usually someone who doesn't like this or that. It's gratifying because a tremendous amount of work went into producing this—practically overnight."

What is the future of futuristic advertising in the world of the top agencies?

"On the basis of the initial reaction and quality of production, we think we'll continue with a space or futuristic—or science-fiction if you prefer—theme in the future," Greenfield reported. "Our instincts said this was a big thing and a good thing. We're not really trying to sell this to science-fiction buffs, we're trying to sell this to people in the market for a new car. It's out of the science-fiction realm that this concept has been borne but it has also been reborn on a national level, increasing people's awareness of science-fiction in all of the arts, making some people buffs who weren't in the first place and increasing the fervor of the existing science-fiction buffs and their commitment. You can not go around and say, 'we told you so'."



Photos: Courtesy of Ford Motors, WABC Radio, N.Y. Life

Top: Ford's Futura ads put their product in a total SF environment. Below: NY rock station combined SF and rock hardware.



Photos: © NBC

the conviction [that] more and more people are interested in science-fiction type shows. We are trying to be involved in the mysteries of the origins of mankind." Last January, the new format became apparent in an episode entitled "Pyramid." Jamie Somers was aboard a NASA ship to ascertain damage to Earth's ozone layer when she encountered a signal from deep space. The signal was aimed at the Fort McArthur complex and, during the course of the show, Jamie and her comrades discovered that an Aztec pyramid was buried deep beneath the station. Enclosed in the pyramid was a startling message involving mankind. It seems that thousands of years ago, the Earth was visited by aliens who found no humans to greet them, only lowly animals. They experimented with developing Man's evolution before taking off into space. Their experiments eventually mutated into the human race. In 1978, the aliens are back! And in force. This season's alien action calls for Jamie to be pirated away to another planet, fall in love with a brawny man from 'out there' and encounter a female peer from deep space. So far, the biggest problem encountered via the new SF-oriented slant has been some of the Universal TV staff's reaction to the requirements of space ship special effects. "They had never handled anything like this before," Siegel explained. When not involved with Somers' extraterrestrial plights, Siegel spends his time planning the forthcoming Marvel superhero telefilm *Submariner*, currently aimed for a fall showing.

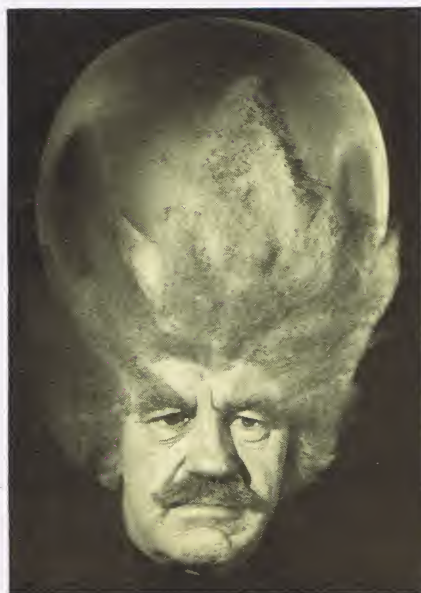
BUCK ROGERS: Originally planned as an hour-long series slated for NBC this spring, *Buck Rogers* has been experiencing more than its share of labor pains. Production of the show has really never gotten off the ground although some optimistic NBC executives are talking about a fall premiere. David Ayres has been constructing exotic alien makeups for the past few months and Matthew (*Close Encounters*, *Logan's Run*) Yuricich has been working on some matte paintings. The fate of the show is still in limbo.

DR. STRANGE: CBS has given the go-ahead for the two-hour telefilm based on the Marvel superhero Dr. Strange. Producer-writer Phil De Guere is currently putting the finishing touches on the premiere episode. Tom Wright, who did the pre-production artwork, is

Science fiction on television currently seems to be in better shape than television in general. Despite several floundering SF entries this season, major networks are desperately looking towards SF as a possible panacea for this season's dreadfully low ratings. And so, as the new shows rise and fall, here is a quick look at what's happening in SF's video realm.

THE BIONIC WOMAN: It should be quite evident by now that NBC's bionic lass has undergone quite a few changes of late (even more drastic than the *Six Million Dollar Man*'s nose job and new hairdo). As a result of the recent rash of SF wide screen successes, the *Bionic Woman* has altered her video lifestyle somewhat. According to executive producer Lionel Siegel "We are going all the way into science fiction. We have

Above: Jack Webb's *Project UFO* is based on the Air Force investigation of the phenomenon, *Project Blue Book*. Below: "The Head" from *Quark* is lost in thought.



Right: Nicholas Hammond as *The Amazing Spider-Man*. Spidey's TV adventures will be similar to his comic book exploits—"super-villains" included. Below: Pre-production sketch of the final battle scene in the *Dr. Strange* TV-movie.



lending his expertise to the project in his post as creative consultant. Director of photography Enzo Martinelli handled similar chores in both telefilms of *The Invisible Man*, and art director Bill Tunke is a veteran of a host of Disney films. Greg Hoblit is associate producer.

THE NEXT STEP BEYOND: The jury is still out on the long awaited sequel series to the legendary spook show, *One Step Beyond*. Hosted and directed by original *One Step* guide John Newland, *Next Step's* pilot aired last January, coast-to-coast. Entitled "Tsunami," the first offering recounted the rescue of a disabled seashore resident caught in the path of a tidal wave by a twelve year-old autistic child who telepathically sensed the danger. Should the networks decide to pick up *Next*



Photos: © CBS

Step on a weekly basis, stalwart *One Step* aficionados will notice a subtle change between the two editions. Unlike the original, *The Next Step Beyond* will avoid gothic-tinged subjects and concentrate mainly on factual oddities of a less grotesque nature. The show is produced by Alan Jay Factor with Collier Young acting as executive producer.

PROJECT UFO: Jack Webb's UFO drama is shaping up to be quite a controversial entry at saucer level. UFO believers and debunkers are alternately praising/condemning it to the hilt. One interesting note: the slick, meticulously planned and semi-militaristic series almost found itself postponed due to a particularly unruly visitor to the set who refused to get into UFO's no-nonsense stride. During the first few weeks of on-location saucer hunting, the cast and crew encountered some of the heaviest rain storms to hit California in years, completely drenching their UFO investigations. A sign from above?

QUARK: With its initial seven episodes now drawing to an end, NBC brass are currently mulling over this show's fate for the fall '78 season.

SPIDER-MAN: As of April 5, *The Amazing Spider-Man* will be a regular feature on CBS. With Charles Fries as Executive Producer, the show will feature Nicholas Hammond as Peter Parker, the all-American arachnid boy. Hammond, who created the role in the original telefilm last fall, will be joined by Robert F. Simon and Michael Pataki as series regulars. Producers Ron Satlof and Bob Janes plan to have the frustrated webbed crusader fend off accursed bronze idols, political exile-assasins and demented pagan high priests during the first few episodes of the show.

THE INCREDIBLE HULK: Bill Bixby and Lou Ferrigno are the Yin and Yang of the Hulk's TV personality this year. The show has been picked up by CBS (twelve shows ordered) after the successful airings of last fall's two telefilms. With Ken Johnson at the helm and James O. Parriott and Chuck Bowman acting as producers, the new series will present quite a few problems for the reluctant muscle man. During the course of the first season, Hulk will do

(Continued on page 47)

*" . . . The human enclave loomed ahead like a series of
ever-growing rings of machinery—a stark contrast with the
infinite black of space . . . "*

Civilization in Space: *The Possible Dream*

CHAPTER TWO — The Cola Wars



Civilization in Space:

The Possible Dream

The Cola Wars

By DAVID HOUSTON
and RICHARD MEYERS

Two elder statesmen—one already retired from the Rama Council, the other only a year or so away from retirement—languidly sipped blueberry wine and carried on their 50-year-old dialogue.

"Another freedom flap coming," muttered Carter, "feel it in my bones."

Schwartz nodded. "Young man's folly," he agreed.

The two men sat in sling chairs at the glassed-in railing of the "Twentieth-G" lounge, near the docking hub of the majestic cylindrical space habitat. Above, below, and beyond them were spread the three villages of Rama, fields of agriculture, domes for hydroponic farming, clusters of red-topped houses and apartment complexes, roads with their bicycles and tiny electric runabouts, and, near one of the concentrations of buildings, a lake for sailing. From their central vantage point, Jordan and Schwartz could see all three of the kilometers-long reflectors outside the enclosure of Rama—three mirrors that brought sunlight, moonlight, earthlight, and starlight to the inhabitants. The vista was nothing that had ever existed on Earth, yet it had qualities of a New England village of 400 years ago.

"Can't ever be true freedom in a society like this," Jordan said, knowing it was what Schwartz was already think-



"... A secret little reddish stalk known only to the children."

ing. "Closed world. Limited population. Limited jobs. Need, really, for absolute controls. Do you agree, Schwartz?"

"Been saying so for years. The day'll come. You and I might not live to see it, Jordan, but one day every minute of every day of the colonists' lives will be regimented, prescribed. Only way. Efficiency. Never had *real* efficiency here, you know. Old Earth habits too hard to break. Look out there, Jordan—isn't that another freighter coming in to dock? Or is that the same one we saw an hour ago backing off to make a better approach?"

Jordan shook his head sadly. "It's

another one," he decided.

"Ought not to be allowed," Schwartz muttered.

A women's melodious voice came from hidden sources around the lounge. "Gentlepeople," she said, "we are pleased to announce the arrival of Transit Alliance Freighter *Pittsburgh*, a charter of the Coca Cola Company—"

"More Coke syrup!" Jordan bellowed. "Ought to send that freighter tumbling off into the Sun! Damn stuff rots your teeth."

"Imagine," said Schwartz, "how many medical supplies could have been sent in place of the weight of all that poison!"

The announcer continued: "The *Pittsburgh* is now disembarking passengers into the Rama decontamination facilities, will unload its cargo at warehouse 8 and will be ready to take on passengers and cargo for its return trip at approximately 0500 hours—"

"Approximately," mumbled Jordan disapprovingly.

"A second freighter," the woman continued, "the Transit Alliance *Vancouver*, a charter of the Pepsi Cola Company, is making its final approach—"

Jordan got to his feet disgustedly. "I'm calling a special session of the Council," he told his friend. "This frivolous waste has got to stop!"

Suspended from the ceiling twenty feet or so beyond Schwartz's shoulder, a video screen followed the progress of the docking freighter. As it approached the yellow-lit docking bay of the space habitat, the freighter appeared as an ever-expanding series of rings, the machinery silhouetted in stark contrast to the darkness from which it had emerged. The slow choreography of the docking, something he had seen countless times, absorbed Jordan. It absorbed him completely.

Meanwhile, the announcer had paused hardly long enough to catch a breath when her voice again interrupted Jordan and Schwartz:

"Gentlepeople, a special session of the Rama Council has been scheduled for 0800 this evening, at the request of representatives of the Coca Cola Company. Would all councilmen please signal the President's office and let him know whether you will or will not be in attendance."

Jordan extracted his personal intercom from the loose pocket of his leisure suit; he punched up the number combination that told the President's computer: yes.

The woman at the message center was having a busy day. Her voice came again: "Paging Geoffrey Merrick, Dr. Geoffrey Merrick. The President is trying to reach you on a matter of some urgency. Dr. Geoffrey—"

"You might know," said Jordan, "that they'd call *him* in on it. Can't im-

The preceding double-page spread:
Twin cylindrical habitats in L-5 orbit. They are connected with tether lines and rotate in opposite directions to prevent wobbling in orbit. In the foreground, a Moonlit freighter approaches the Rama Habitat docking bay.

agine how Merrick got such a reputation for wisdom."

"It's just because he's old," Schwartz said, stroking his white beard—which was fully as distinguished-looking as Merrick's.

* * *

The cola controversy had been brewing for well over a year. A bright vice-president of advertising at Pepsi had first had the brainstorm to use the Rama Habitat locale as a background for a commercial campaign. The commercials had not said so, but a vague impression was left with the viewer that Pepsi was the favorite drink of the intrepid pioneers of outer space. This was entirely false. The cost per kilogram of freight made the soft drink prohibitively expensive to ship from Earth to Rama. On rare occasions, Travelers would pay a fortune for the privilege of transporting a case or two—for lavish celebrations of nostalgia for the remembered delights of Earth. But that was the extent of the commerce—for Pepsi, Coke, or any other soft drink. Until a year ago, when two things changed all that:

A new and more efficient heavy-launch-vehicle came into service that drastically reduced freight costs; and the Coca Cola Company—boiling mad over the success of the Pepsi Rama commercials—decided it would fight fire with fire.

Coke sent up a freighter load of their product which they priced at about the same level as the best Rama-produced wines. For a few months, no social event was really "in" unless it made available at least a taste of the famous elixer. Oddly, the adults—particularly those who had either been born on Earth or had spent some time there—were the enthusiasts. The children—who had heard of the stuff only from seeing Earth's 3-V commercials—were rather indifferent to it. The Coke company got a few commercials out of Rama (not very successful ones, since they largely copied the Pepsi originals), and then the supply ran out.

Pepsi discovered a fairly good method of freeze-drying that allowed for the transportation of larger quantities of Pepsi syrup, per unit of weight; they were able to make the juices available at a cost lower than Coke's. Unfortunately (for the Coke people) the process did not work as well with Coke syrup (it clearly left a bitter after-taste), so the next freighter-load of liquid Coke syrup had to be sent at the high freight rate. Determined not to be undersold, however, Coke decided to take a loss. The popularity of the two soft drinks ran neck and neck.

Possibly because freeze-dried Pepsi suffered a bit in translation, Coke did, for a while, attain greater popularity. This, of course, made matters worse—for Pepsi. Pepsi abandoned its economical freeze-drying and returned to ship-



"The vista was nothing that had ever existed on Earth . . ."

ments of heavy syrup. And down went the price of Pepsi (the company taking a terrible loss) to a notch just below Coke. This, of course, made matters worse—for Coke.

Stockholders of both major Earthside companies were frantic. "Drop this crazy obsession!" they told their officers. "Pull out before the whole company goes bankrupt!"

But it was too late. Newspapers and 3-V commentators delighted in giving blow-by-blow scores (usually in dollar figures) in the "Cola Wars at Rama Habitat." It seemed to be a battle to the death. It seemed that the company which won the endorsement of Rama would rule the market.

The two freighters now unloading at warehouse 8 represented all-out aggression. This was the first time, for either company, that an entire freighter had been chartered to transport nothing but syrup. Each company was determined that with this load, his company would win—even if they had to *give* the stuff away!

But what was wrong with the children? Sure, they liked cola, but not with the near-addiction of their Earthside counterparts. Did living in outer space dull the taste buds? To find out, the Pepsi Company had this time brought a small team of child psychologists and nutrition experts.

Rumor had it that the Coca Cola Company had an even more ambitious plan to insure supremacy. And survival. It had something to do, most felt sure, with Coke's request for a special session of the Rama Council.

* * *

Inside and out, the Council Chamber resembled all other habitat meeting rooms—stark, clean, well-lighted, with foldaway furnishings. There was no concession to political aspiration, no illusion of grandeur. Elected officials in space were scientists, businessmen, educators—much more than politicians. They had to know more about the intimate workings of their unique world than anyone else, so that action in the face of emergencies might be swift and sure. Vested political interests had no place in solving problems caused by unexpected solar flares, meteoroids too large to be accommodated by the cylinder's protective layers, imbalances in recycling systems, and the like. For most, the so-called Cola Wars were a minor irritation—an itch they had come here to scratch, once and for all.

Councilman Jordan started the ball rolling. "I propose we send them both packing. We have no need for the products of either company."

"Yes we have," argued protein engineer Maggie O'Leary. "My husband loves his cola; and why shouldn't he have it?" She admonished: "We are a free community, I remind the distinguished elder councilman, and we do not operate strictly on a survival-need basis. Quality of living is a foremost—"

Jordan interrupted, somewhat irrelevantly, to say: "This council has the prerogative to admit or turn away any travelers to its doors. If we do not exercise common sense and reasonable—"

"Ladies and Gentlemen," the President said firmly, "we are not here to argue the merits of cola—or of one company's product over the other. Our

charter clearly states that free commerce with Earth is healthy and desirable for our own citizens and is to be promulgated. Our charter allows for visitors, businessmen, vacationers, applicants for citizenship—whoever—to come and go so long as their activities pose no threat to—”

Jordan interjected: “Cola rots the teeth.”

“—our own people. Ahah! Come in, Dr. Merrick!”

The man at the door was tall, regal in his posture, white of hair and beard, young in his movements and gestures, with a deep confident voice. “Thank you, Mr. President,” he said, entering. Taking an empty seat at the long conference table, he said, smiling, “I take it we’re here to solve the cola problem. Would you fill me in?”

“A Coke representative is waiting to see us now, in the anteroom. Before we hear his ideas, I thought we ought to be sure our own positions are clear. You know about the Cola Wars?”

Merrick chuckled. “Indeed. Delightful conflict.”

“Why delightful?” asked the President.

“Well, surely no one here is taking the matter very seriously. It hardly affects Rama, one way or the other. Except to our advantage. We stand to lose nothing, and to gain quite a bit—with no effort expended on our part.”

“Please explain,” a councilman requested.

“Assume first that cola is worthless. Even in that case, we are getting favorable publicity all over the Earth. Have you seen those ads? Have you ever seen better or more attractive photography? If even so marginal a product as cola finds advantage in our endorsement, why, the whole sphere of commerce seems open to us. *Nothing* is too heavy to transport any more. And if a mere endorsement by Rama (an unofficial endorsement, of course has such power, just think what a head start our own businessmen will have in selling Rama-made goods on Earth. Suddenly we are no longer just manufacturers of power satellites, perfectly round ball bearings, industrial crystals, and so on. Now we can sell—well, breakfast cereal if we want to.

“Now, assume that cola is a great and valuable luxury item on Rama—as it certainly was prior to the Cola Wars. Assume that the stuff is delicious—” he glanced toward Jordan, “and does not rot your teeth, if used sensibly. Look at our advantage now: the cost of cola here at Rama is now roughly the same as its cost on Earth! If it were being imported by one of our own firms, the cost would be astronomical. I say let the war rage on! And I don’t see why this august body needs to concern itself with the battles.”

The President explained: “I suspect the Coke man outside will ask us to fix the selling price, governmentally.”

“NO!” shouted about half the councilpeople.

“Yes!” shouted the others.

“Send them both back where they came from!” Jordan shouted.

The President raised his hand and obtained silence. With a glance he invited Merrick to speak.

“You all know my views on price fixing by government,” Merrick said with a shrug. “It applies to imports and exports as well. The more the competitors struggle, the lower the prices fall for us. The more the prices fluctuate, the greater their struggle for quality. Leave them alone.”

“Are you sure your *hands-off* advice doesn’t have a personal motive?” Jordan blurted out.

“It has several personal motives,” Geoffrey calmly replied. “What are you alluding to?”

Jordan concentrated his eyes on the surface of the table. “Rumor has it that you and Raymond Henry have been conspiring on some secret project.” His line of sight lifted toward the safety of the translucent ceiling and his voice took on a childishly accusatory tone, “a project that just might have some relationship to this cola war.”

Geoffrey chuckled and shook his head, “We do live in a small-town atmosphere, don’t we? Yes, you’re right—I hope to have a commercial interest in our deciding to keep the doors of competition open at Rama . . .”

(Jordan’s eyes flicked directly toward Geoffrey for the first time.)

“... but my positions on freedom and individual rights are so well known that I’m sure no one would accuse me of fabricating a stand on this particular issue that is not consistent with everything I’ve fought for since I set foot in space.”

“You and your impractical ideals!” Jordan huffed. “We’re living in a *real* world, with *real* problems. Those *laissez-faire* theories don’t hold water.”

Merrick continued, unruffled, “This habitat is proving to all that freedom works—not only in theory but in practice. We’re showing the whole Earth that even a handful of citizens living in a bottle floating in space can be free to make their own choices. Why alter that trend over so trivial a matter as a soft drink price war?”

Jordan, controlling himself, said, “We are not talking of curtailing the freedoms of our *own* citizens—just those of outsiders.”

Merrick looked at Jordan, smiled, and shook his head. “Can’t have it both ways. Mr. President, I suggest we invite this cola spokesman in to find out just what it is he does want.”



“The man at the door was tall, regal in posture . . .”

* * *



"Rama's Crystal Palace was a . . . depot for botanical experimentation."

The coke representative entered humbly, made all the formal and correct statements, and then presented his deal:

"We propose that in exchange for an exclusive franchise—so that only Coke can be sole at Rama, for a reasonable period of time—we will pay into your operating fund a royalty not only on every container of syrup sold here, but on income attributable to our advertising campaign—worldwide. We hope to install a processing and bottling plant here at Rama—entirely at our own expense, of course—so that costs to your citizens can be kept as low as possible. We think our offer has been made so attractive to you that . . ."

The Coke man discussed dollar amounts, their conversion to Rama credit "currency," expectations for the following fiscal year, and other details. Income from the deal could—if Coke's figures were to be taken on faith—practically eliminate the maintenance tax burden of Rama citizens!

Geoffrey watched the figures and sales charts flash by on his display. Others at the conference table looked to Geoffrey from time to time to catch his

reactions. Geoffrey had none. When the Coke man thanked the Council for its attention and once more retired to the anteroom, all eyes turned respectfully toward Geoffrey Merrick.

"There are a great many ways," Geoffrey said, "to reduce our citizens' financial burdens. Like the yearly lottery I have been pushing for thirty years. There's also piracy; we could plunder passing freighters—until they stopped passing by. There's inflationary financing; we could keep upping our claimed worth—until Earth economists lost all confidence in our rates of exchange. Or we could go into the business of franchising commodities—until commercial outfits ceased to come to us for fear of being shut out, not by fair market competition, but by arbitrary edict. I oppose any acceptance of any deal with Coke—or Pepsi."

"But surely—!"

"In *this* case—!"

"Isn't it worth the risk?"

The President raised his hand for silence. "One at a time. What's your opinion, Mr. Jordan . . . ?"

* * *

With the bright artificial illumination of night, the Crystal Palace seemed even more worthy of its name, which was borrowed from the legendary central feature of the International Exhibition of 1851. Rama's Crystal Palace was a greenhouse and a depot for botanical experimentation. Geoffrey Merrick—theoretical scientist, inventor, engineer—maintained a lab there. He had leased it six months earlier.

Geoffrey bounded up the steps to the loft-laboratory with its roof of polarized plastiglass. He had his key extended—when he realized that the door was unlocked.

"Come in, Geoff," said a familiar voice from the darkness within.

Merrick threw open the door and saw Raymond Henry silhouetted by the faint illumination from ultraviolet gro-lights.

"Good grief!" Geoffrey said, taking his friend's hand; "When did you . . . you didn't arrive . . . ?"

Raymond nodded. "I hitched a ride on the Coke freighter. Docked this morning." To add to Geoffrey's amusement, Ray added: "Well, the seat was for sale. I told them I was a chemist.

What happened at the Council? I know what Coke had on its mind."

"Success for the freedom fighters," Geoffrey said cheerfully. "Coke and Pepsi are on their own. How was Dallas?"

"Big. Sprawling. Took my breath away. Earth is really alive and well, Geoffrey—you ought to go down for a visit."

"Before it's too late for me, you mean? Perhaps I should. But Ray, I'm not talking about sight-seeing. What did Dr. Pepper say?"

"They loved it," Raymond said

some unknown weed—that at present grows nowhere but at Rama Habitat. They loved the bit about the kids, too; they want to run a whole series of ads with the Rama children. Just the romance they were looking for—a secret little reddish stalk known only to the children, who managed to keep it entirely to themselves for *nine years*! Have you learned more about that, by the way?"

Geoffrey nodded. "Just the other day, I ran into Stevie Haviland out near the hub. He was just sitting idly, looking out the viewport at the stars, munch-

sweetness is from a carbohydrate that is not assimilated as sugar. So it's a sugarless sweet drink. The cellular structure of the stalk is such that four major vitamins are manufactured in it, plus half a dozen valuable minerals. The juice not only tastes great, but it's actually good for you!" Geoffrey reached into the refrigerated compartment and lifted out a flask of purple liquid. "Take a couple of glasses from the shelf behind you, Ray. This latest batch is best, I think. It's made from a concentrate that was crystalized. Just add water, or carbonated water, and stir. We can ship to Earth enough for about 260 gallons—in a small suitcase.

Raymond held the two glasses while Geoffrey poured. "I was just wondering," said Raymond; "have you been able to isolate the sweetening agent? Is



"EL-5 Thousand . . . 'The elixir that's out of this world!'"

almost in a whisper. "Signed a contract with me on the spot. They want to call it *El-5 Thousand*. And their ad people were already making up corny phrases like 'The elixir that's out of this world!'"

"I was afraid they'd call it Sola Cola. Or Mutated Mountain Dew."

Ray laughed. "One of them did suggest Rocket Root Beer."

Geoffrey was puzzled. "You mean they signed a contract with so little information?"

"Yes, but it's a provisional paper. They need to learn more about the stuff—run their own tests. All they really needed to know was that the syrup comes from a plant—a mutation of

ing on a stalk. He told me the kids first found it not long after that break in the cosmic-ray shield was repaired. That figures. The plant *must* be a mutation of some kind, although we can detect no lingering radiation in the plants or even in the ground near the shield break. The kids kept quiet about it at first simply because they knew their parents would be upset to learn that the kids were putting funny looking plants in their mouths. Then it became a sort of affair of honor never to reveal the secret of the 'Moon Plant.' You know how that is with kids."

"Have you found out anything more about the plants themselves?"

"Oh yes. Good things. The natural

there a separate market there?"

Geoffrey opened a desk drawer and withdrew a small corked vial of white powder. He dropped it in Raymond's shirt pocket.

"Cheers!" said Geoffrey, raising his glass.

"Cheers, partner," Ray said, laughing.


NEXT ISSUE:

**Chapter 3—
"The First
Hundred Years"**

(Continued from page 39)

battle with Times Square hoodlums (in an episode called "The Godfather Of Times Square"), get involved with a Rocky-esque prize fighter and drug smugglers ("The Final Round"), be suspected of murdering a pretty young thing ("Murder In The Playboy Mansion"), become enmeshed in a child-abuse case and run across a horde of rabble-rousing Grey Panthers. Dr. Banner will have his hands full as well. In future episodes the hapless scientist 'Hulks-out' on a 747 while in flight; sees a psychiatrist about his unique condition with equally unique results; teams up with a zoologist working on research concerned with the nasty side of primates (watch for an interesting boy-meets-gorilla encounter here) and, with the aid of the Hulk, busts up a syndicate assassination bureau in "The Hulk Breaks Las Vegas."

MINI-SERIES MOVIES: CBS' *War Of The Worlds*, a proposed mini-series or weekly project, is reportedly encountering money problems. Paramount has yet to reach a final verdict on George Pal's *In The Days Of The Comet*. The options involved with the Wells tale are a mini-series, a massive telefilm, or just wait-and-see. *Fire In The Sky* is the name of a three-hour telefilm currently being prepared for NBC by Bill Driskill and Columbia Pictures TV. Richard Crenna stars as an astronomer who warns of an impending collision between Earth and a runaway comet. Phoenix, Arizona is doomed and all that co-star Elizabeth Ashley can do is watch. Jerry Jameson is directing, Hugh Benson producing.

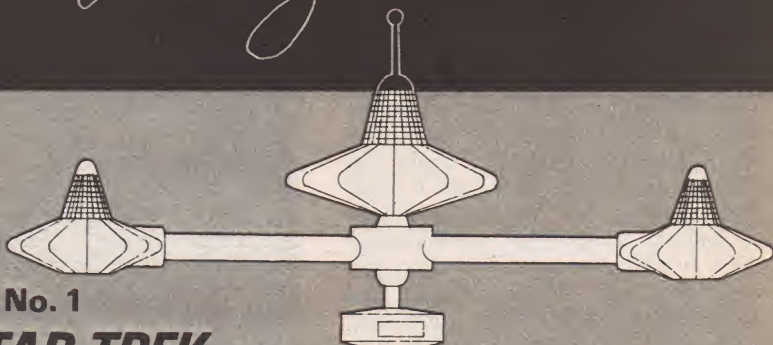
Probably the best news yet in the SF made-for-TV drama field is the announcement made recently by Ray Bradbury that, this fall, NBC will telecast *The Martian Chronicles* as a series of six one-hour episodes. The teleplays will be adapted by Richard Matheson from Bradbury's best-selling book of the same name. This will be the first time a network is presenting a special dramatic event openly referred to as a work of science fiction... a term usually taboo in television circles. While Bradbury is delighted that science fiction will finally be getting a chance to come out of the closet, he insists that aside from the obvious entries (*Star Trek*, *Logan's Run*) SF has always had a place in TV programming. "There was science fiction in *The Avengers* with Patrick MacNee and Diana Rigg," he pointed out recently. "And the James Bond movies, with all their technology, and *Mission Impossible*. But networks didn't call them science fiction. They were afraid to, I suppose, because every time they get up nerve to call something science fiction they fail dismally." 

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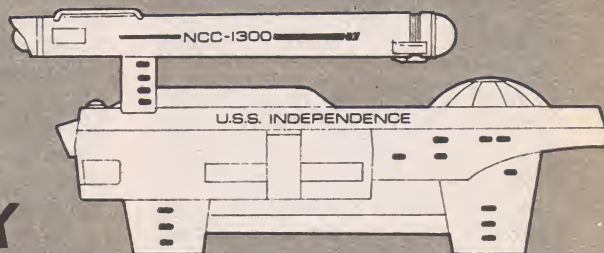
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By MALCOLM BRENNER

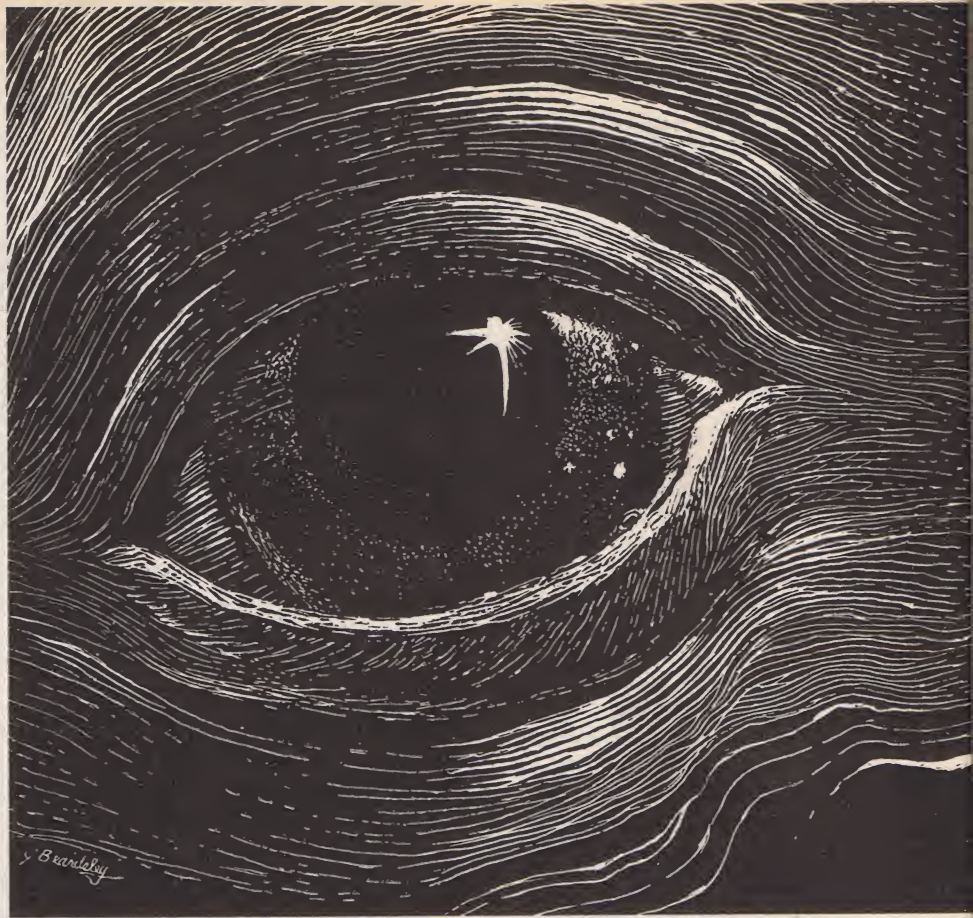
Suppose you are tuning your radio, hunting for your favorite music, when the following bloodcurdling announcement comes on:

"NEWS FLASH: Scientists report the Earth is about to be invaded by extraterrestrial aliens. The invaders range in length from six to thirty feet, and their brains, much larger than ours, suggest a fantastic degree of intellectual development. They are so strong they can leap twenty feet into the air or travel two hundred and fifty miles a day for days at a time without sleep! Their jaws are filled with needle-sharp teeth, and their tales can break bones with a single blow. Furthermore, these aliens possess an unusual 'sixth sense' which enables them to look into our internal organs, uncovering our hidden strengths and weaknesses! Their cryptic language, undeciphered by scientists, allows them to communicate ten times faster than we do. They can hear the sound of a single drop of rain falling fifty feet away! And latest reports indicate they possess highly developed psychic abilities which allow them to read our minds and second-guess our thoughts. Prepare yourself!"

"What is this?" you might wonder. "Another War Of The Worlds prank? Should I get a gun; clean out the old fallout shelter? Or should I pray?"

But wait! Before you can stir, the announcer's back on the air. *"NEWS FLASH: More on those alien invaders. Scientists report that they are not warlike, but peaceful! Their astounding powers are used only for gathering food and for protection against their enemies. Despite their great strength, they are helpless under Earth's gravity and can exist only in a weightless environment. Our air is corrosive to their skin and will kill them in twenty-four hours unless they are constantly bathed in fluids from their home world. Their huge brains have produced no form of technology, and many scientists believe them to be no smarter than dogs. They lack clothes, shelter, and even the most rudimentary tools. They have rescued humans from mortal danger, on occasion, and they have built-in smiles! Congress has imposed fines up to \$20,000 and jail penalties up to one year for killing or injuring them; but scientists studying the aliens report several thousand are being held captive around the world, and despite government protection more than fifty thousand of them may be killed next year—accidentally!"*

By now you'd know it was a hoax—but you'd be wrong! These aliens are



not the dream of a science-fiction writer, nor the creation of some Hollywood special-effects department. They are *real*. They have existed on Earth for over thirty million years, their form unchanged, their roots going back before the beginning of human evolution. We call them *dolphins*.

All of the above statements about dolphins are true, including those that seem contradictory—depending on whom you choose to believe. They reflect the current scientific confusion about dolphins, but it's nothing new. Throughout history, dolphins have either been worshipped as demigods, or devoured as delicacies, with no middle ground. Prehistoric Norwegian hunters carved them on the walls of caves. The author of the biblical Book of Job held a creature called Leviathan in high esteem; we now call the same creature orca, or killer whale, an overgrown dolphin with an overblown reputation for ferocity.

The Nabataeans, a pre-Christian race of Bedouin merchants, were so fond of dolphins they carved them into the statutes of their gods, posing a riddle to the archaeologists who discovered their crumbled temples—in the middle of the Negev desert! The Greeks were infatuated with them; killing a dolphin, the sacred beast of Sun-God Apollo, was an unforgivable sin. Greek authors told stories of their friendliness which were considered fantasy until well into the 20th century. Pliny the Elder, a

Greek naturalist, is credited with discovering that they are not fish but warm-blooded, air-breathing mammals, like ourselves. The Romans and Polynesians ate them, but the Chinese and Vietnamese held them to be divine.

The truth about dolphins is no less astounding than the many myths surrounding them, but until the 1950s almost nothing was known about them. Dolphins had been kept in oceanariums since the early 1900s, but not until World War II and the development of underwater microphones was their astonishing sense of echolocation (or "sonar," to use a military term) discovered.

Like bats, dolphins emit high-pitched clicks, which sound like a door with rusty hinges. Originating in the larynx and in nasal sacks below the blowhole (nostrils), these clicks are reflected off the dolphin's concave skull and through an oil-filled 'acoustic lens' in its domed forehead. By varying the shape of this lens the dolphin can spread a wide beam of sound for miles under the sea, or focus it with laser like intensity to nearby objects. The "sonar" pulses are ultrasonic to humans, but the dolphins hear their echoes bouncing off objects. By listening carefully, a dolphin can determine the size, distance, and shape of an object; what it is made of; whether it is alive or nonliving; whether it is approaching or retreating, and how fast; whether it is hollow or solid, textured or smooth—everything but its color! Since

"The aliens have landed!" This is a classic science-fiction theme that has been examined in hundreds of books and dozens of films. But no matter how the aliens have been treated by the various media, one thing is constant: when they appear, humanity reacts. It is inconceivable that the human race would come upon another sentient species and ignore it—or is it? The incredible fact is that this has already happened!

THE WET ALIENS

animal flesh is 75% saltwater, dolphins can "X-ray" each other—or humans—with harmless beams of sound.

A dolphin's enormous and complex brain enables it to process all this information instantly. The brain of a bottle-nosed dolphin¹—the species seen in oceanariums and on TV—is about 40% larger than a human brain, and appears to be superior to ours as a thinking machine. It has more folds on the neocortex, where rational thought originates, and the density of its neurons is greater. The only animals with larger brains are elephants and some whales, the dolphins' distant cousins. Some scientists believe the extra brain matter is occupied with controlling the dolphin's large bodies, or analyzing their complex echolocation. But whale sharks and dinosaurs possessed huge bodies and very small brains, and bats are able to use their "sonar" with brains that fit on a dime! So these theories do not wash.

Given this fantastic biological computer, you might think scientists would have long ago recognized the dolphin as a creature of unique intelligence. Not so! Dolphins lack hands and, being self-sufficient, have no need for human technology. Their oceanic lifestyle makes them difficult to observe. Not until 1955 did anyone wonder what the dolphins might be doing with all those brains, aside from chasing fish. In that

year Dr. John Lilly, a young psychiatrist and neurophysiologist, was conducting sensory-isolation experiments for the Air Force to determine what would happen if an astronaut were cut off from contact with Earth. Lilly simulated weightless outer space by immersing himself in a tank of warm seawater. Breathing through a facemask, isolated from all sensory inputs, Lilly experienced incredible hallucinations and proved that the brain can generate its own ghostly form of reality from within. He also began to wonder what the mind of a creature living under such conditions would be like.

He conducted a series of experiments on the dolphins at Marineland near St. Augustine, Florida. While anesthetizing them to implant electrodes he made his first startling discovery—when a dolphin loses consciousness, it stops breathing! Unlike other animals, each breath for a dolphin requires an act of will. His first few experiments proved fatal to his subjects and angered the Marineland staff, some of whom have not yet forgiven him. After developing more humane techniques he was able to "map" the dolphin's brains and determine which areas controlled what behavior.

During these experiments, Lilly noticed that the dolphins in his laboratory behaved more like curious humans than white rats or rhesus monkeys. They second-guessed his experiments and tried to imitate the voices

of his assistants! Fascinated, Lilly ended his brain research and began studying the dolphin's sound emissions. He found they produce complex trains of whistles and squawks with which they communicate. In 1961, convinced of the existence of a dolphin "language," Lilly received a NASA grant on the ground that his research might help us better understand communications from other planets—when we receive them.

He quickly encountered hostility from other scientists. Like early UFO investigators, Lilly found himself up against a wall of mockery and prejudice. His recordings of dolphins mimicking human speech were not convincing to untrained ears. His remarks were sensationalized by a press more eager for headlines than the plodding methodology of science. His stories of "intelligent" behavior were laughed at by cetologists² familiar only with robotized oceanarium dolphins. Even the basic premise of his research was challenged; any idiot could see that human beings were the most intelligent creatures on earth—otherwise the dolphins would be keeping *us* captive!

Undaunted, challenged by the alien mind of the dolphin, Lilly began a series of experiments on his own mind, using sensory isolation and the then-legal drug LSD. Tripping among his dolphins, he realized that, if he *was* right, keeping them captive was not just an insult; it *changed* them, in the same way involuntary imprisonment changes a free man into a slave. The dolphins locked in his lab were *not* the same creatures as those roaming the wild seas; they were products of his experimental parameters. "I felt," he has since admitted, "like I was running a concentration camp for dolphins." As he considered closing the lab and setting his subjects free they began to die mysteriously, starving or drowning themselves. In 1967 he released the survivors, ending his research.

Lilly remains much-hated among professional cetologists, partly for his "unscientific" theories, partly for his early brain-probings, and partly for his drug experiments, which nearly cost him his life on two occasions. If he were the only person to report such experiences

2. A scientist who studies cetaceans, i.e. whales, dolphins, and porpoises.

1. Also wrongly called porpoises, which are similar to dolphins, but smaller and not as intelligent.

*Malcolm Brenner is a freelance writer based in Sarasota, Florida. He has spent the last four years researching and writing a book about dolphin intelligence and human-dolphin communication called **In Contact, An Interspecies Romance**.*

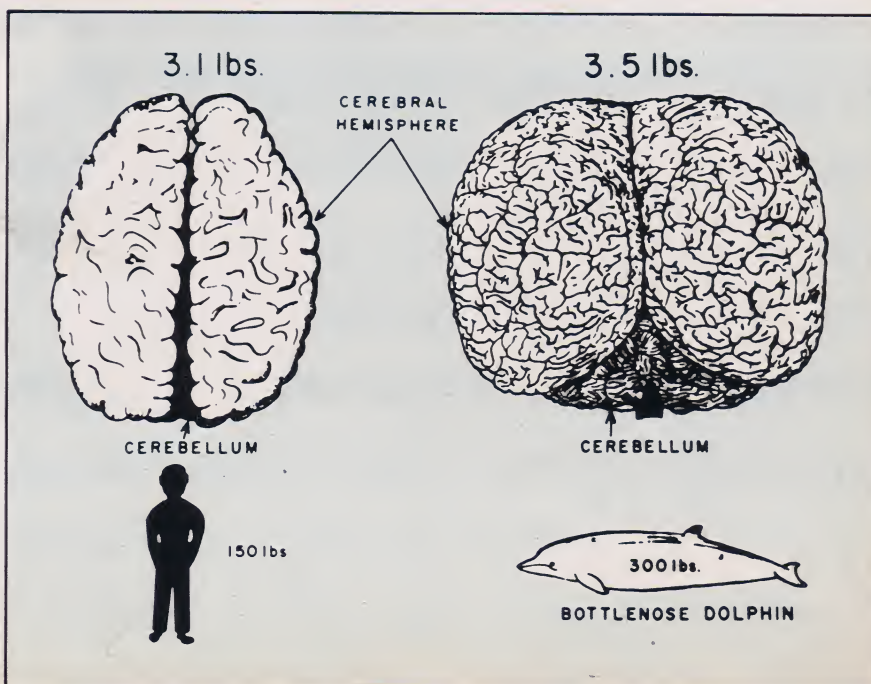




with dolphins one might well doubt him, but a small number of scientists and laymen, fascinated by the idea of an Earthly non human intelligence, began their own investigations. Some supported Lilly's theories; others sought to disprove them. Still others wavered.

This is typical of the problems scientists encounter when they attempt to measure the dolphin's intelligence. Its sense and thought processes are so different from ours that it's hard to develop a meaningful test! But there are still profound mysteries surrounding them. For almost every fact postulated by a respected dolphin researcher, an equally illustrious scientist can be found to contradict it! For example, Lilly claims that dolphins can produce a "distress whistle" when in danger or pain. This call, described by him as a whistle of rising, then falling pitch (like an inverted V) brings other dolphins to the rescue. Rene-Guy Busnel, a French cetologist who works with Jacques Cousteau, agrees about the "distress whistle" but insists it's exactly the

Above: Playful dolphins in the Miami Seaquarium. They have no problem with understanding voice commands while scientists have yet to decipher their sonic language. Below: The brain of the dolphin is highly developed, perhaps moreso than man's.



Left: At home in the open sea, dolphins have no natural enemies, not even sharks.





Above: A beluga being fed at the Vancouver Aquarium. *Belukha* means "white whale" in Russian — they are actually Arctic dolphins.

opposite—falling, then rising in pitch (like an upright V)! The *Caldwells*, equally respected, maintain there is no such thing as a distress whistle. According to them, dolphins have only one whistle apiece, which they repeat over and over to tell other dolphins "here I am," like Kurt Vonnegut's mythical Mercurian harmoniums.

Are you sufficiently confused?

One person who shares Lilly's views is Ric O'Feldman, formerly a trainer for Ivan Tors' Flipper TV series. After working with dolphins for years, O'Feldman concluded that the dolphins were not only smarter than he was—they were sometimes able to *read his mind*, learning complicated tricks faster than seemed possible. He now devotes his time to saving the whales and dolphins from extinction.

Another supporter is Michael Greenwood, formerly dolphin trainer for the U.S. Navy—and CIA! Greenwood became interested in marine mammals during the Navy's SeaLab program. Dolphins can dive to 600 feet and return in three minutes without being crushed by the pressure, equal to 200 atmospheres, or dying from the bends³. Having gained some experience training

sea lions, Greenwood was asked to take over a top-secret dolphin project in the Florida Keys. The mission, under a conservationist cover story, was to train dolphins to run intelligence missions against communist Cuba, planting instruments on atom-powered Soviet warships which would transmit data on the size and power of their nuclear reactor. The CIA and Navy factions on the project were warring with each other; the electronic equipment malfunctioned; and the dolphins were poorly trained!

Greenwood became convinced it was

immoral to train such intelligent and friendly creatures for warlike ends. He, too, came to believe they could telepathically read his mind. He now fears they are facing a slaughter by the world's naval powers, who are unable to tell an innocent dolphin from one trained for espionage.

But the dolphins are already facing a wipeout. For the past fifteen years, tuna fishermen have been killing hundreds of thousands in the huge purse-seine nets used to trap yellowfin tuna which are packaged for sale as "chunk light." The dolphins and tuna stick together—no one knows why—and when the fish are netted the dolphins panic. Their "sonar" beams pass uselessly through the net's mesh, and in their confusion they may become tangled and drown, or, worse yet, be dragged on board and crushed in the machinery. In 1971, an estimated 320,000 were killed. Since then the numbers have been dropping, thanks to new types of nets, new catching techniques, and the Marine Mammal Protection Act, which sets yearly quotas on the number killed. But the battle isn't won: the tuna fishermen, chafing under what they feel are unfair restrictions, talk of taking their boats to nations without quotas.

Dolphin-ESP is a highly puzzling issue, one that is puzzling and infrequently discussed. Studies on humans show that, contrary to most science fiction, strong emotions, rather than

SUGGESTED READING:

Mind in the Waters. Joan McIntyre, Ed. Scribner's, 1973.

Lilly on Dolphins. John C. Lilly, MD. Anchor Books, 1975.

The World of the Bottlenosed Dolphin. David & Melba Caldwell. Lippincott, 1972.

Marine Mammals and Man. Forest Wood. Robert B. Luce, 1973.

Smarter Than Man? K.E. Fichtelius & S. Sjolander. Random House, 1972.

Thinking Dolphins, Talking Whales. Frank Robson. Reed Publications, 65 Taranki St., Wellington, NZ \$10.00 mail order.

GROUPS TO JOIN:

Human-Dolphin Foundation. Box 4172, Malibu, CA 90265.

Project Jonah. Box 476, Bolinas, CA 94924.

Environmental Defense Fund. 2728 Durant Ave., Berkeley, CA 94704.

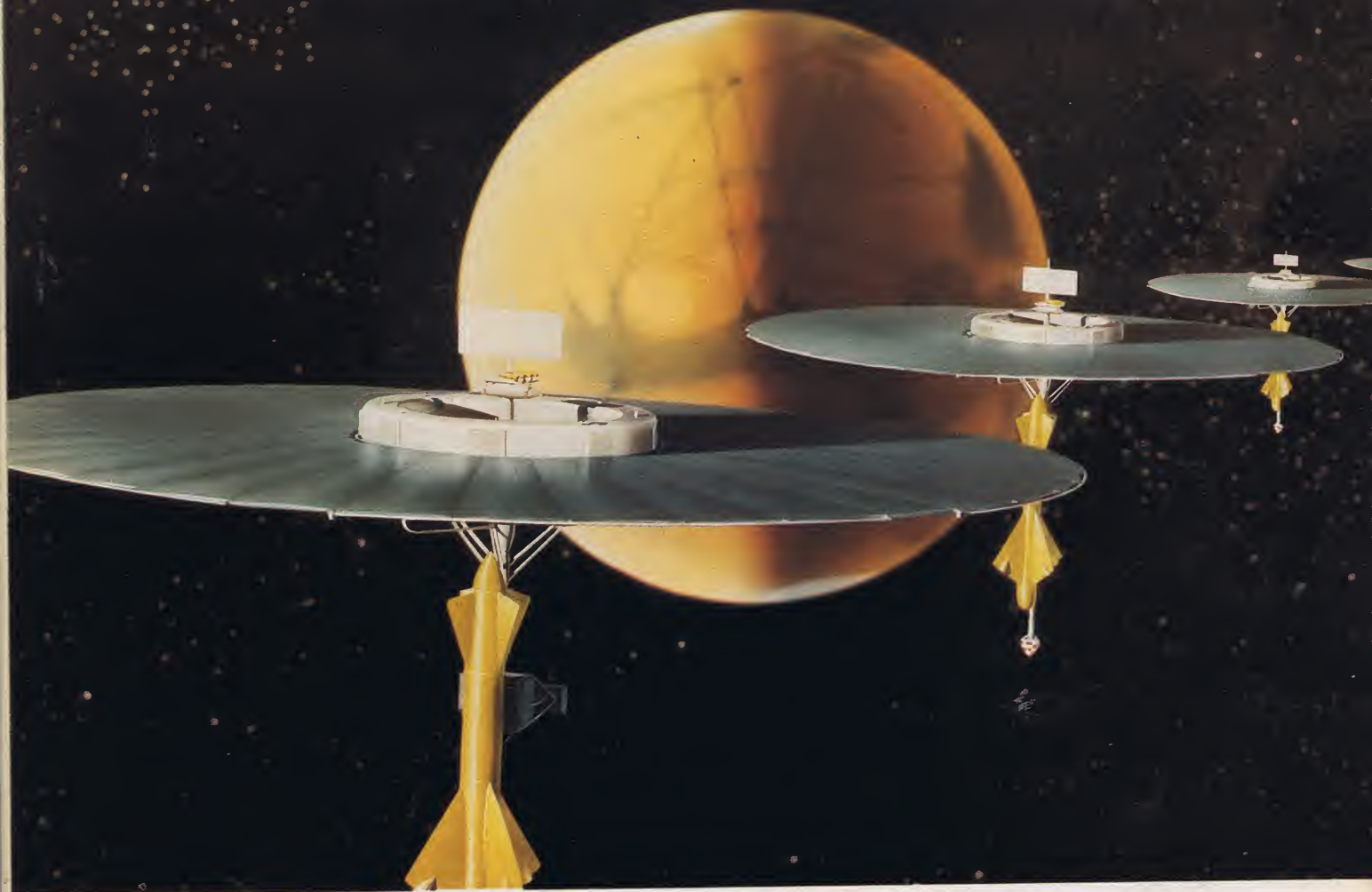
Greenpeace Foundation. 2007 W. Fourth Ave., Vancouver, BC, Canada, V6J 1N3.

Dolphin Embassy Project. P.O. Box 59, Potts Point 2011, Sydney, Australia.

3. A painful and often deadly condition where compressed gases in the blood bubble like a shaken-up bottle of soda pop, brought on by sudden decompression.

(Continued on page 66)

They're Following Our Script: Walt Disney's Trip To Tomorrowland



Above: Dr. Stuhlinger's atomic powered Mars ships were 500 feet across and were to be assembled in space. Below: Von Braun's 4-stage rocketship being moved to the launching gantry and pad.

By DAVID R. SMITH

On March 9, 1955 television audiences across the country tuned in to Walt Disney's *Disneyland* TV series were in for a shock. As the narrator finished his introduction and the familiar sight of Sleeping Beauty's castle faded from view, Disney fans found themselves gazing at something quite out of the ordinary. There, on the screen, was not Mickey Mouse, nor Donald Duck nor even Davy Crockett. Seated in his office was Walt Disney himself, holding a sleek model of a rocket. On that Wednesday evening, for the first time in the show's history, Walt Disney was preparing his audience for a trip into Tomorrowland with a startling vision of things to come!

"In our modern world," began Disney, "everywhere we look we see the influence science has upon our daily lives. Discoveries that were miracles a few short years ago are accepted as commonplace today. Many of the things

that seem impossible now will become realities tomorrow. One of man's oldest dreams has been the desire for space travel—to travel to other worlds. Until recently, this seemed to be an impossibility, but great new discoveries have brought us to the threshold of a new frontier—the frontier of interplanetary space."

Keeping the rocket model in full view, Disney outlined what the viewers would soon be encountering. He promised to "give a factual picture of the latest plans for man's newest adventure," using both accepted facts and perceptive theories to give shape and substance to the great leap into space. That evening's first Tomorrowland presentation, "Man In Space," was to be the first of three "science factual" presentations that would take Disney fans into the

David R. Smith is Director of Archives at Walt Disney Productions, a post he has held since the inception of the archives in 1970.

Photo: © 1955 Walt Disney Productions



mysteries of deep space during the next three years. The shows combined meticulously researched data with mind-boggling visuals and old fashioned animation slapstick, using the skills of the entire Disney staff—led by director Ward Kimball—and the minds of some of the greatest names of science in the 1950s. The three Tomorrowland presentations garnered worldwide acclaim and, perhaps, even played a part in furthering the American space program. But, in order to understand the making of the shows themselves, one really has to explore their origins in the years before Disney's spectacular series had even been conceived of as TV fare.

In the early 1950s, Walt Disney was beginning to formulate plans for an amusement park to be called Disneyland. This would be an amusement park like no other amusement park; in fact, that term was shunned because of the connotations of dirty, dingy midways and besides, a new term, "theme park," had been coined. Disneyland would indeed be built around a theme—Disney—and divided into four general areas or lands: Adventureland, Frontierland, Fantasyland, and Tomorrowland. In each of these four realms, the rides, shops, and food facilities would follow the theme of the land. Adventureland would feature a jungle cruise and shops selling exotic goods of Africa and the East. Frontierland would feature stage-coach and riverboat rides, a plantation house restaurant, and a show in the Golden Horseshoe saloon. Fantasyland would have attractions based on the immortal Disney animated film classics. And finally, Tomorrowland would feature a trip to the moon and exhibits of modern technology by some of America's leading corporations.

Walt Disney, in order to help finance his dream, took a step which horrified other movie producers but which he would never regret—he went into television. The rise of television in the early years of the decade had created a situation where Americans were finding entertainment in the comfort of their living rooms rather than going out to their local movie theaters. Box office receipts plummeted. Movie producers pointedly tried to ignore the new media: for years they would not allow any movies made after 1948 to be televised. Walt Disney, on the other hand, had premonitions about television. He realized that this was not just a temporary phenomenon but something that was here to stay. Rather than act like an ostrich with its head stuck in the sand,

he would use television for his own purposes. He would use television to help advertise his motion pictures, and he would use television to get his Disneyland built. He made an agreement with the American Broadcasting Company stating that he would go onto their network with an hour long, weekly show if they would loan him some money to help build Disneyland.

The new show was called "Disneyland." When it first aired in October, 1954, its aim was not only to entertain but to promote the park that was under construction in Anaheim, California. Early plans were to eventually originate the show from Disneyland, and so the program was divided into the same four realms that would be found at the park. The tremendous Disney film library could be called upon to supply the shows from Adventureland and Fantasyland. For Frontierland, Disney decided to do three shows on the frontier hero, Davy Crockett, which turned out to be an excellent choice. But when it came to Tomorrowland, Disney was momentarily stumped. Tomorrow was the future. There had been no previous Disney work on future technology. Similar problems were encountered in trying to decide what to put into the Tomorrowland at Disneyland.

The person to whom Walt Disney turned for help was Ward Kimball. Kimball had been a member of the Disney staff since the mid-1930s and had distinguished himself as an animator in such films as *Snow White and The Seven Dwarfs*, *Pinocchio*, and *The Three Caballeros*. Some people have called Kimball the world's first hippie; at the very least he was a little ahead of his time in his dress and with his ideas. He remembers, "Walt came to me and said, 'You guys are the modern thinkers around here'—probably using the term in a snide way—'can you think of anything we can do on Tomorrowland?' And that's when I said I had been following some very interesting articles about space in *Collier's Magazine*. It was fascinating for me to realize that there were these reputable scientists who actually believed that we were going out in space."

The *Collier's* series of space-related articles were well-researched, and written by some of the most prominent space experts of the period. In the March 22, 1952, issue, Wernher von

Braun wrote "Crossing the Last Frontier," Willy Ley wrote "A Station in Space," and Heinz Haber wrote "Can We Survive in Space?" Von Braun continued with articles later that year on flights to the moon, while Ley described the insides of the space ships and space stations. The series continued in 1953 with an article about a space station and in 1954 with "Can We Get to Mars?" Many of the illustrations of von Braun's rockets and Ley's space stations were drawn by the noted illustrator, Chesley Bonestell.

Kimball and his layout man, Ken O'Connor were the first to start on the project. They read and reread the *Collier's* articles and then for advice approached Charles Shows, who was doing a live space program at television station KTLA in Los Angeles. Shows began work on some early treatments, but he had difficulty mastering the Disney storyboard approach. And so, Disney sketch artist and writer, Bill Bosche, was added to the crew. Shows, Bosche, and Kimball presented their outline to Walt Disney in a conference on April 17, 1954, and a transcript was made of that meeting, and many later ones as well. Some of the comments reveal the dedication of the Disney staff in trying to come up with a definitive program:

Walt Disney: There are two sides to go or this—comedy interest and factual interest. Both of them are vital to keep the show from becoming dry. You need a good balance to keep it from becoming too dry and corny. We don't want to compete with Sid Caesar or do that type of thing. We want to do something new on our show. . . .

We are trying to show man's dreams of the future and what he has learned from the past. The history might be a good way to work in a lot of your laughs. People laugh at inventions of the past such as the guy trying to fly with feathers, because with the inventions and the progress of science today, people feel superior. Man is always trying to invent something so that he doesn't have to work so hard. He is the human animal. I think that is your basis. He is constantly trying to simplify things. . . .

Ward Kimball: The kids really accept this stuff on space. They really believe it. . . . To make this information interesting to the whole family, you have to have the comedy touch in there for the younger kids. The facts are fascinating but if you lighten it up with cartoons or something, it would make a complete family deal. . . .

Walt Disney: We could show that man has been constantly seeking a way to get up into the air. We should show what he might find when he did get there. He has wanted to fly all through history. Now he wants to get out on Mars to see what all these people look like. . . .

Ward Kimball: We could go into a little cartoon thing on Mars and its inhabitants. It would be a great little cartoon.

Walt Disney: We should be careful and keep our serious stuff separate. We have to watch it so the material doesn't get corny I think this parallels the True Life Adventures—facts, and opening up this world to the people.

Throughout the meeting, Disney stressed man's curiosity. He saw real possibilities in this space show, and it was given a working title of "Rockets and Space." Already he was planning his moon-ride attraction for Disneyland, and in the meeting he gave his first description of it: "We want to build this thing in the park. In the space ship you have a viewing room above and below. When we take off we want to give the effect of really taking off. You get the noise, the sound effects, and you see the gases there. Pretty soon you see the earth pulling away. We really want the people to get the feeling of a trip to the moon."

After the meeting an event occurred that old-time Disney hands cannot remember happening before or since. Bill Bosche recalls, "I remember when we finished the meeting, Walt was enthusiastic about it. He walked out of the story room, stopped at the desk, and

ripped off a blank sheet of notepaper. He handed it to Kimball and said, 'Write your own ticket.' I remember Harry Tytle was standing there when Walt said that and his eyes just about dropped out of his head. Walt *never* said anything like that."

Ward Kimball realized that any work on a space project was going to be expensive, so he was delighted with the blank check which he received from Walt Disney. The key to his whole plan was the need to bring in prominent scientific advisors. Not all space experts in the U.S., however, were willing to help. Some had become discouraged after years of trying to get the country to begin a space program. One such person said to a Disney staff member in a letter, "I am a retired old scientist having found through thirty years of strenuous research the stuff that most people of our days can very well get along without. I say this with the knowledge that insofar as today's scientists are concerned, the fruits of my labor could very well lay dormant for another century. However it is possible that I may be wrong. I must say that your firm seems always to have been foremost in expounding new views and perhaps in this case Mr. Walt Disney will outdistance our ordinary scientists and, possibly, shorten the aforementioned century."

Where better to search for qualified experts than in the pages of the *Collier's* articles? The first to be contacted was Willy Ley, a German originally trained as a zoologist but who had come to the United States before World War II and

had become a top space historian and writer. Within two weeks after that initial April meeting, Ley arrived at the Disney Studio and began a series of meetings with Kimball and Bosche and key members of their staff such as Julius Svendsen, John Dunn, Art Stevens, Ken O'Connor, and Jacques Rupp.

The men were fascinated with Willy Ley. Despite the odorous cigars that he chain-smoked, they gathered around him and hoped that some of his knowledge would rub off on them. According to Bosche, "Willy was a real encyclopedia. He had information on just about anything you wanted. If you asked him a question, he'd pause for a second, then he'd say in his music hall German accent, 'Vell, as a matter of fact,' and then he'd take off with an encyclopedic description of whatever it was you were asking him. He was a very amusing fellow; we all got a big kick out of him." Ley regaled the Disney men for hours on end with information about all aspects of space travel. He insisted that the planned flights could be done immediately, that no additional discoveries were needed, just money and motivation. Future discoveries would only make it easier.

After several days of sessions with Ley, the Kimball unit put together a new storyboard presentation for Walt Disney. In that meeting on May 14, an idea surfaced: the single "Rockets and Space" show could easily be divided into two shows. Disney recommended, "In effect it's like making one feature, but you are dividing it into two parts for TV. Build that space ship, put it together up there and then it's a cliff-hanger. They will be waiting for this next one. On the next one show what the space station does and go to Mars." He had the idea that the two parts could then be assembled as a theatrical feature for the foreign market, where the real money was. It was only after several more months of meetings that it became obvious that they had enough material for three shows, not two.

Walt Disney was very busy, with the construction of Disneyland almost ready to begin and was unable to provide his usual advice and counsel to the Kimball unit during the production of the space shows. Nevertheless, he attended the May 14 meeting and delivered a philosophical underpinning which was to guide the unit during the upcoming months.

We are known for fantasy, but with these same tools that we use here we apply it to the facts and give a presentation. I think that's very important for this series—a science factual presentation. The only part I would play would be the moderator—introduce and let it

The interior of the command stage of the Moon rocket designed by Werner von Braun. Frank Gerstle played the captain in 1955.



go. That's the key for this whole series. I actually would be asking the questions for the audience. I think there is something exciting to the audience if we set it up and the group is made up of part of the staff here and the experts. Men dealing with fantasy and men dealing with fact coming together, meeting and combining their resources to present this material.

The format of the first show was becoming apparent: begin with a little history of rockets, then a section on space medicine, followed by the building of a space ship. Disney suggested for the space medicine section a little human cartoon character to act as a guinea pig. "We can have this little character right off the drawing board. He could be listening in on the discussion. He's worried because he's the one that's going out into space. So he immediately has life. He becomes the guinea pig. He's the little guy that comes in on all the experiments. As we go from one thing to another he's always there. Every time we have a homo sapien there, he's the fellow."

Two more scientific experts were desired for the first show: Wernher von Braun, so they could use his design for a four-stage spaceship, and Heinz Haber, space medicine expert. Von Braun, formerly head of the German V-2 rocket installation at Peenemunde during World War II, had come to the U.S. at the end of the war, along with many colleagues, to continue his research on rockets and space travel. At the time, he was chief of the Army's Guided Missile Development Division at Redstone Arsenal, Huntsville, Alabama. Haber had spent five years as research scientist at the U.S. Air Force School of Aviation at UCLA. Ley signed a contract in May, 1951, calling for him to receive a weekly salary. Haber and von Braun signed contracts in July, but they were paid consultants' fees rather than salary. Haber eventually took a year's leave from his university post to assist Disney on several science-factual presentations, one of the most widely acclaimed being "Our Friend the Atom."

Story work continued during the summer of 1954. Before von Braun came on the scene, Willy Ley, a friend of his for many years, wrote him to explain what he would be doing on the show, and reported, "For the live action sequences, three models will be built—one, a V-2 rocket, one a 3-stage instrument carrier, and your 4-stage ship—all to the same scale and in proper proportion to each other. Possibly we will also build a model of the space station. This still remains to be decided. It is simply a question of whether it takes less time to build the model or draw it. The space station will be just as designed for *Collier's*. For the 4-stage ship a small

change seemed indicated. All the artists felt that a Delta wing looked more modern. I saw to it that the total area of the Delta wing is within 50 square feet—the same area as your swept back wings . . . The technique of drawing the scenes will be such that the audience will always know that this is a drawing, even though it moves. We do not try to make it appear like the actual event. It is not a George Pal production, but a Disney production."

Disney craftsman Wathel Rogers was put to work building the scale models, and it was decided to also include a model of the space station. (This latter model is presently on exhibit in the Smithsonian's National Air and Space Museum in Washington.) Harry Tytle was given the job of trying to procure film footage of rockets for the history section. Early on he discovered that it would be easy to secure German rocket footage—from German film archives and from footage captured by the U.S. during and after the war—but vintage film footage on American accomplishments, such as those of Robert H. Goddard, was almost nonexistent.

Wernher von Braun was a very busy man, but he managed to work in several visits to the Disney Studio during trips to the Los Angeles area. Often he was involved in meetings at Douglas until 5 or 6 p.m., after which he went to the Disney Studio and worked with Kimball and his unit until well into the early morning hours. He became very closely involved in the story, and he made many suggestions, some of which went into great detail. For example, in a July meeting, he explained about fueling the rocket:



Photo: © 1957 Walt Disney Productions

There is no need for any fueling trucks around the ship, because fuel storage must be in underground tanks. These tanks are adequate for the fueling of one ship, and are replenished through a pipe from the tank-farm which should be several miles away. The underground fuel tanks at the launching site are connected with a fueling panel in a pit near the launching site. This panel is serviced by an operator who opens the hatch and enters the pit. There are several pipelines connected to the arm of the gantry structure through which the hydrazine and nitric acid are pumped through the fuel lines to the various stages. All three stages and the returnable tank for the winged upper stage are filled separately. The fueling pipe for the top stage should be 1" in diameter, for the 3rd stage 2", and for the 2nd stage 8", and for the 1st stage 32".

Ward Kimball considered von Braun a genius. Here was a man who was devoting his life to space flight. He had carefully spelled out his ideas in the *Collier's* articles, but no one seemed to be paying attention. The Pentagon certainly didn't believe in the ideas. So, when Disney called him to do the space shows for TV, he pounced on the opportunity. He realized the power of TV, with millions of people watching. You just don't get those numbers reading *Collier's*. Von Braun was a salesman and a showman; in fact, he has been called the Walt Disney of the space field. He knew that you needed humor and entertainment in your story. In discussing the period when the manned rocket arrives in orbit, he mentioned:

We can add a couple of humorous notes here. For example, there can be radio communications between the general and the ship—he may ask questions and instead of a reply all he gets is this terrific roar—or later on, after the motor cut-off, instead of an answer from the crew he will hear these silly remarks the crew makes about weightlessness. One might say: 'Get your feet out of my face.' I was thinking that what comes out of this giant loudspeaker on the ground could be irrelevant at times.

Von Braun and the Kimball unit carried on an extensive correspondence between meetings, with Bill Bosche sending long lists of technical questions and receiving detailed replies. One letter contained a P.S. by Ward Kimball, who humorously chided, "It'll never get off the ground." Von Braun answered with his own P.S., "So you say it will never take off the ground! All I can say is 'hah-hah!' Wait and see."

It was decided to use the three experts—von Braun, Ley, and Haber—in the film to add authenticity, even though all had German accents and there was some discussion as to whether that might be a drawback. "Man in Space" became the title of the first show

Mars expert, Dr. E.C. Slipher of the Lowell Observatory, joined the Disney production to advise "Mars and Beyond."



Photo: © 1955 Walt Disney Productions

Werner von Braun, Willy Ley, Walt Disney, and Heinz Haber were the designers of tomorrow who stirred America's interest in the exploration of outer space.

Medicine.'” The guinea pig character, called “homo sapiens extra-terrestrialis” or “space man,” makes his appearance in the cartoon segment. Haber warns of some of the possible consequences of weightlessness and meteors striking the spaceship. He continues:

On earth, we are not exposed to dangers from space owing to the protective layer of our atmosphere. But up there, even the hull of the ship will not shield man against the possible hazards of the mysterious cosmic rays. These tiny bullets from the infinity of space will continually penetrate everything. They may prove to be harmful to man. The most energetic of these atomic rays may feel like stings as they shoot through the body.

Wernher von Braun then comes on to describe his four-stage orbital rocket ship. He prefaced his remarks by saying, “If we were to start today on an organized and well-supported space program, I believe a practical passenger rocket can be built and tested within ten years.” His description of the winged fourth stage brings to mind the current design and testing of the Space Shuttle, but pre-dates our ideas by 22 years: “First we would design and build the fourth stage, and then tow it into the air to test it as a glider. This would also allow the crews to practice. Next, low-altitude flights would be made firing the small rocket motor.” Von Braun’s rocket ship was designed to carry 10 crew members in the top section, which would have its own small rocket motor,

when the decision was made to divide the material into three shows. The first would discuss history, space medicine, and the launching of the four-stage rocket; the second, the building of the space station and a trip around the moon; and the third, a trip to Mars.

“Man in Space” totalled 48 minutes, exclusive of commercials. After Walt Disney’s introduction, Ward Kimball acts as the narrator and is himself shown on camera. The show begins with a history of rockets, from the world’s

first, used during the battle of Kai-fung-fu in China in 1232 A.D., to the Wac-Corporal “Project Bumper,” a two-stage rocket in 1949 that went up 250 miles to touch the realm of outer space. Willy Ley then comes on to say that a three-stage rocket is the next logical step. The third stage would go into orbit and send back the information needed in order to send a man into space. In introducing Haber, Kimball says, “One of the big question marks of future space travel will be man himself. How he will react mentally and physically to this unearthly experience is the concern of a new field of science called ‘Space

Its descent slowed by a drag chute, a lander craft nears the Martian surface.



Gathered in front of the storyboards for "Man In Space" are Charles Shows, Ward Kimball, Ruby Barbera, Willy Ley, Julius Svendsen and Bill Bosche.

wings, and landing gear. The rest of the rocket comprised:

1st stage—1,060 tons of fuel with 29 motors, to lift the entire weight of the ship vertically off the ground.

2nd stage—155 tons of fuel with 8 motors, to be dropped when the speed has reached 14,300 mph.

3rd stage—13 tons of fuel with 1 rocket motor, to give the passenger section the final kick to attain orbit, and to remain attached until just before the return flight.

It was envisioned that the first launching would take place on a small atoll of coral islands in the Pacific, "where man is dedicated to just one cause—the conquest of space." The show ends with a dramatization of what man's first flight in space might be like, laying the groundwork for the future construction of a space station, the exploration of the moon, and eventually a reach to the planets and the infinite universe beyond.

"Man in Space" was well-received by the TV audience. In simplifying for the layman some highly technical steps involved in sending a man into space, it succeeded in awakening an interest in space among Americans, as von Braun had hoped it would. Scholer Bangs wrote in the *Los Angeles Herald & Express*:

Walt Disney may be America's "Secret Weapon" for the conquest of space! Apparently and quite by accident, he has discovered the "trigger" that may blast loose his country's financial resources and place the Stars and Stripes of the United States aboard the first inhabited earth satellite. Disney's immediate achievement, with the aid of this triumvirate of space authorities, is the suggestion that space travel no longer is a wild dream; that it is so near that we can practically feel the earth tremble under the rocket blast of Dr. von Braun's spaceship. "Man in Space" is believable and Disney has close to 100,000,000 Americans believing. Half of the voting population of the USA has probably reached two impressive conclusions: "It CAN be done!" and "Let's get on with it!"

One particularly important person viewed "Man in Space"—President Dwight D. Eisenhower. Ward Kimball recalls, "When 'Man in Space' was finished, Eisenhower borrowed the show to run for the brass in the Pentagon. He called Walt personally to borrow 'Man in Space' and they ran it for a couple of weeks. It was like an educational space primer." The show aired on March 9, and had a rerun on June 15; on July 30, the President made the momentous announcement that the government had approved plans for launching earth-circling satellites as part of the U.S. participation in the International Geophysical Year. A third airing of "Man in Space" was hurriedly sched-



Photo: © 1954 Walt Disney Productions

uled for September 7 because of the interest created by Eisenhower's announcement.

After hearing that President Eisenhower had borrowed the film, Disney publicists figured out they could get a little mileage out of the event. That prompted an exchange of correspondence between Kimball and von Braun:

Kimball to von Braun, Aug. 24, 1955:

"The Studio intends to ballyhoo the first 'Man in Space' show when it's rerun for the third time on September 7 as the one item that contributed the most to Eisenhower making the space satellite announcement. After he sees the Moon picture he'll probably come out and make a few more announcements (we hope)."

von Braun to Kimball, Aug. 30, 1955:

"I am quite upset about your statement. I am sure that a statement to the effect that this show contributed the most to President Eisenhower making the satellite announcement is bound to antagonize quite a few people who had a hand in putting the project across. They will feel that I myself through the vehicle of the Disney Studio am trying to get credit for more than I deserve and this would hurt my pleasant relations with many of the people I have in mind. I would appreciate it if you would take this matter up with Walt and try to have the pitch changed. There would be absolutely nothing wrong with playing up the point that the President's announcement showed that all these space matters are given very serious attention today and that some of these things may be closer to reality than many people believe. But for God's sake don't put it that this show triggered the presidential announcement. The preparatory work that finally led up to this announcement has been going on a long time and these people would not like such a statement at all. As a result the statement would hurt the cause far more than it would help.

Kimball to von Braun, Sept. 1, 1955:

"I am sorry you became so alarmed over my statement that we were going to exploit the fact that Eisenhower was inspired to make the space satellite announcement as a result of our picture. Please file my remarks under the heading of 'Colorful Expressions'."

Did the show really help trigger Eisenhower's announcement? With the principals no longer around, we may never know.

Man and the Moon

The story for the second show on space was formulated at the same time as that for the first show. Ward Kimball decided to preface the trip to the moon with a little history of the moon. This would be the humorous, animated part of the show, with legends, superstitions, and songs about the moon. An accurate scale model of the moon was built at the Disney Studio and approved by Roger Hayward, who had created a similar one for the Adler Planetarium in Chicago.

For the moon trip, the Kimball unit decided to use live action instead of animation to lend greater believability. The inside of a spaceship was constructed on a Studio sound stage and four actors were hired to portray the captain, navigator, engineer, and radio-man. To make the set as authentic as possible, two Boeing 377 pilot's chairs were borrowed, along with two model 618M aircraft seats from Douglas. Prototype space helmets were borrowed also, and Ken O'Connor and Bill Bosche, along with von Braun, invented a space suit.

Von Braun again provided the narration. Kimball wrote him, "The Studio has purchased a new teleprompter which I think you will find a lot easier to use in helping you remember the lines. This shooting will be a little more complicated than the last picture, and anything you can do to memorize lines will help out in the confusion."

Von Braun followed the moon lore section by introducing the concept of the moon flight:

The voyage around the moon must be made in two phases. A rocketship taking off from the earth's surface will use almost all the fuel it can carry to attain a speed great enough to balance the pull of gravity. Unpowered, it will then keep circling the earth in an orbit outside of the atmosphere. This is the first phase. However if we refuel the ship in orbit with fuel brought up by cargo rocket ships, it can set out on the second phase, the trip around the moon and back.

The space station, established as an advance base 1,075 miles above the Earth, would be in the shape of a wheel 200 feet across. The outside rim would contain living and working quarters for a crew of 50 men. An atomic reactor would drive a turbo-generator to supply the station with electricity. Access to the station would be by an air lock in the hub. The wheel would rotate at three revolutions per minute, with the resulting centrifugal force producing an artificial gravity for the men in the rim. The space station would make a complete trip around the Earth every two hours, with no apparent motion to the crew, but hurtling around the earth at 16,000 miles per hour.

For assembling the structure and handling repairs, von Braun invented a special space suit, nicknamed a bottle

suit because of its shape. The bottle suit used gyros and two small rocket motors so the operator could tilt and move in any direction. There would be seven remotely-controlled mechanical arms, each a specialized tool—hook, wrench, screwdriver, etc.

The moon trip depicted on the show was used to test methods and equipment to be used on later voyages into deep space. It was essentially a scouting trip, with no landing attempted. The 53-foot moon rocket carried a crew of four men. A little suspense was added to the trip as a small meteor pierced a nitric acid tank, necessitating a repair in space using the bottle suit. On the dark side of the moon, the ship fired flares in order to perform their photography. Despite the Disney visualization, von Braun reported, "Even though we now have the theoretical knowledge necessary to make a trip to the moon, it will be many years before our plans can fully materialize."

Walt Disney had the first showing of the moon picture for the American Rocket Society at the Studio in conjunction with their convention in Los Angeles. The large model of the moon was set up and dramatically lighted in front of the theater. The show was well-received by the rocket experts and later by the public when it was shown on TV. One complaint that appeared in a number of letters concerned the whooshing noise made by the flare rockets on the dark side of the moon, as there is no

sound in space. Kimball today defends the film on this point:

Look at *Star Wars* and those "ching, ching, ching, ching" sounds. What would you have if you didn't have sound in *Star Wars*! You have to do that. That is the license you have to take. Von Braun always went along with it. Willy Ley would say, "You vud not hear the sound of it." And that's the difference between von Braun and Ley. That's why von Braun sold the space program. He had imagination. Willy was a repeater of Newtonian facts. They all had to be proven. Heinz Haber was the same way. Everything he did was based on known discoveries and proven facts, extended here and there. Von Braun had an imagination, you can go through history; the people who went beyond those that said, "no you can't do that" were the ones who made the discoveries.

Mars and Beyond

Plans for the third space film began taking shape in 1954, and Kimball was aiming for a Spring, 1956, airdate when Mars was closest to earth, but the show did not air until 1957, for a variety of reasons. After the airing of the first two shows, the American space program proceeded with Project Vanguard, spearheaded by the National Academy of Sciences and the Navy, rather than von Braun's Redstone project, which had planned for putting aloft our first satellite. Public opinion was still skeptical. Alton L. Blakeslee in the *Los Angeles Times* in January, 1956, predicted that the first firing would come in the latter half of 1957. But he cautioned, "Don't be swept away by over-enthusiasm or arm-chair speculation. Successful launching of the little satellites alone will be a tremendously complicated task. It will be a first experimental step, as the first Wright Brothers' flight was only a starting point in the knowledge that now makes jet planes possible. Manned space flight is a chapter for some indefinite future." Jack Anderson and Fred Blumenthal in *Parade* predicted a tiny satellite for 1958, but went on to say we would launch a man-carrying satellite in 1980 and circle the moon in 1988. A landing on the moon was represented by only a question mark.

The National Academy of Sciences and IBM asked Disney to make a film on Project Vanguard, so the Kimball unit was assigned the project and "Mars and Beyond" was temporarily placed on the back burner. They prepared a story and the Studio was all ready to go into production when an event occurred that shook the world.

On October 4, 1957, Russia orbited Sputnik I, the first artificial satellite, marking the dawn of the space age and jolting the United States with shock waves that were felt throughout our political and educational institutions. The immediate result at the Disney Studio was the cancelling of the Project Vanguard film.

Just a month after Sputnik I, the Rus-



Left: The TWA Rocket to the Moon was the center of Tomorrowland in 1955. Below: The entrance to Tomorrowland after its redesign in 1967 by Disneyland "Imagineers."



Photo: © 1955 Walt Disney Productions

Photo: © 1967 Walt Disney Productions



The von Braun designed "bottle suits" assembled Space Station 1 on Disney's "Man and the Moon" broadcast in 1955.

sians launched Sputnik II, this time with a dog as a passenger. After Sputnik II, von Braun and his group of former German rocket scientists were instructed to prepare for the launching of an artificial satellite. Von Braun promised on November 8, 1957, to put a satellite into orbit within 90 days.

"Mars and Beyond" aired on December 4, 1957. Two days later, the hopes of Americans were temporarily dashed when the Navy project's Vanguard rocket blew up on its launch pad. It was up to von Braun's group to uphold American honor by launching Explorer I on January 31, 1958, the first American satellite. It was followed by the finally-successful Vanguard I on March 17, 1958.

Disney was lucky that he had concluded the story meetings and filming sessions with Wernher von Braun before Sputnik, because after October, the scientist became too busy for such frivolities as entertainment TV shows.

Most of the story meetings had been held two years before. Willy Ley had designed an atomic, dumbbell-shaped spaceship for a Mars voyage; von Braun disagreed:

So far, we have tried to be as factual as possible, but this third picture is Fantasyland. What I am saying is this: Willy never pretended to know what a Mars ship would look like; he based his ship on the fundamental idea of a powerful reactor. But the fuel for such a ship would be a problem. Basically, atomic energy only provides heat. But these guys forget you have to convert that heat and thrust in a vacuum—and fundamentally, you can get heat into motion only by expelling something.

Von Braun suggested that Kimball bring in a colleague of his, Dr. Ernst Stuhlinger.

Dr. Stuhlinger was a nuclear physicist, who had in 1953 written a paper on "The Possibilities of Electric Space Ship Propulsion." He travelled to the Disney Studio and helped the Disney artists design the spaceships for the Mars flight. Writing to Ken O'Connor, he said, "Here is now the schedule for the trip to Mars and back. The total time for the expedition (3¼ years) does not seem unreasonable. I was quite satisfied to realize that the trip to Mars and back with an electrically-propelled space ship is so well within the limits of feasibility." Bill Bosche recalled that Stuhlinger was a very shy, retiring man, but absolutely brilliant. It was the feeling of the Disney artists that he sat in the back room with a calculator making von Braun's grand ideas work.

During the preparations for the show, Willy Ley, von Braun, and Kimball went to the home of Rex Bohannon, and it was there that von Braun saw Mars for the first time. According to Kimball:

That was the closest that Mars had been in years. It was a beautiful night in La Crescenta, up in the hills, and we had this 6-inch refractor telescope. We had Mars and there were the polar caps and there were the little markings across the surface. For about five minutes out of the two hours, the resolution was beautiful; there were no disturbances. Von Braun was fascinated; he had never seen Mars this close before. He swore he could see canals. He just didn't say a word, and he was a pretty talkative guy. He was really impressed.

Kimball recalled the last "Mars and Beyond" story meeting with von Braun:

He'd come in about 5 in the afternoon, and many's the time we'd work until 3 or 4 in the morning. Then I'd drive him back to his hotel. I remember the final night he spent with us, working with Stuhlinger on nailing down the atomic rocket hardware and how it would be presented. It was a tough night and we were sitting there in our shirtsleeves sweating. It was a long session. When he was through, he threw down his pencil and turned around to a piano and for ten minutes played Bach, wide open. I didn't even know he played the piano. He just rattled it off, flawless. He was a genius. He could do anything. Then he stopped, clapped his hands, and said, "Well, Wahd," (that's the way he pronounced my name), "how about taking us back to the hotel?"

For the humorous section of the show, Kimball decided to discuss the possibilities of life on other planets, considering even the crackpot ideas in order to take advantage of his unit's unique style of animation. In a story meeting he mentioned:

We have quite a few new fellows coming in under the training program and to start a program of getting other people interested in what we are doing, we sent out a questionnaire asking them to draw up their conceptions of what a Martian would look like. From that it gave us an idea that we might have a section along with all the others on what life might be like on Mars—Disney version.

Ley was asked pointedly if he believed there was any life on Mars. He replied, "My personal belief which I cannot defend with any great amount of reasoning is—not anymore. I think there might have been at one time." Kimball's plans for the section were reinforced by a radio newscast on June 18, 1957 which reported that Air Force space medicine researchers had determined that some forms of basic life might be possible on Mars, "conditions seemingly fatal for

most life forms on earth could be the habitation of creatures entirely unknown to man." The creatures that Kimball and his artists created certainly fit this category; there was no limit to their imagination.

The completed television program again opened with an introduction by Walt Disney:

In this exciting age when everyone seems to be talking about the future possibilities of space travel, there is much speculation on what we will discover when we visit other worlds. Will we find planets with only a low form of vegetable life? Or will there be mechanical robots controlled by super-intelligent beings? One of the most fascinating fields of modern science deals with the possibility of life on other planets. This is our story.

Another scientific expert joined von Braun on this show—Dr. E.C. Slipher, senior astronomer and one of the world's foremost authorities on Mars, from the Lowell Observatory in Arizona.

The Mars flight visualized on the show featured an expedition of six of Dr. Stuhlinger's atomic-powered, umbrella-shaped spaceships. The ships,

500 feet across, were assembled in space and departed for Mars from the previously built space station. A small landing craft was carried for the final descent to the Martian surface from an orbit 620 miles above. The trip lasted 13 months and 6 days.

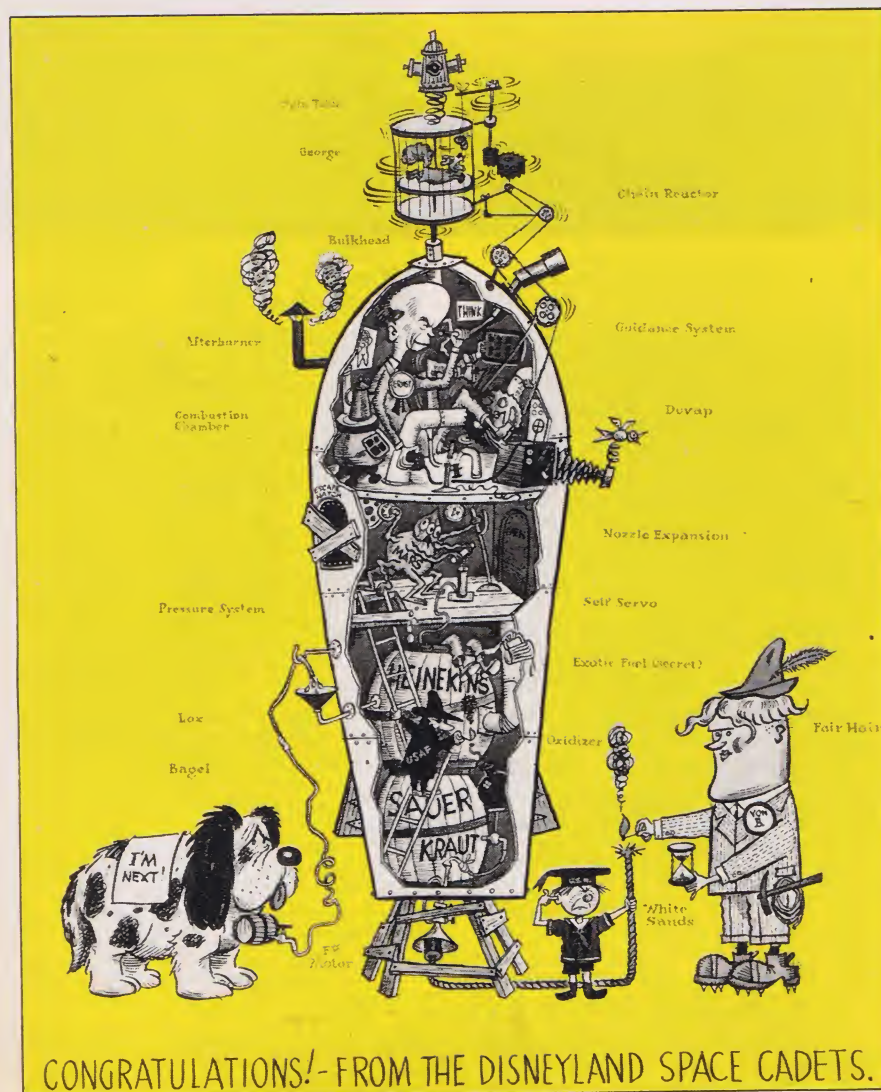
The show concluded on a philosophical note:

. When an earthman finally walks upon the sands of Mars, what will confront him in this mysterious new world? Will any of his conceptions of strange and exotic Martian life prove to be true? Will he find remains of a long dead civilization? Or will the more conservative opinions of present-day science be borne out with the discovery of a cold and barren planet where only a low form of vegetable life struggles to survive? These questions will be answered by our space pioneers of the future. In solving the enigma of the red planet Mars, man may find a key that opens the first small door to the universe.

As the narrator intoned these words, a flying saucer zipped across the screen. Willy Ley and Heinz Haber had from the beginning fought to leave out any mention of UFOs, arguing that this would immediately cause skepticism among the viewers, but Kimball saved it for the very end. This third show had been more science-fiction than science-factual, and necessarily so because so few facts about Mars were known at the time. If a glimpse of a flying saucer was to appear anywhere, this would be the appropriate place.

Because of its timeliness, coming at a moment, according to one reviewer, "when man's achievements in space are beginning to catch up with his thoughts and dreams," "Mars and Beyond" received special press screenings across the country prior to its airing. The reviews were excellent. The *Oakland Tribune* wrote, "Having previewed 'Mars and Beyond' this reviewer recommends it to any who have wondered or worried about the significance of Russia's Sputnik and Muttnik; it's an educational spectacular." Other favorable reviews followed: "a winner on any planet," *The Washington Evening Star*; "consistently interesting and informative, with enough light touches to make it amusing and enough solid detail to hold the imagination," *New York Times*; "should serve TV producers well as a model of how to combine information with entertainment," *Time Magazine*; "Disney's prize effort of the season; this whole series done by Disney on outer space travel has been a shining example of the versatile use of fact and fancy to make a show both amusing and informative—and a little controversial," *San Mateo Times*.

There were several reasons for the success of the space shows. First, Walt Disney had insisted that they be factual, with the humor taking a back seat—"First get the material straight, then find the way you can tell it in an entertaining fashion." Second, no



This cartoon was roughed out by Ward Kimball and finished by John Dunn. It was sent to von Braun at the time of the launching of Explorer I.

CREDITS

MAN IN SPACE

Produced and directed by Ward Kimball. Written by Ward Kimball, William Bosche. Music: George Bruns. Layout design: A. Kendall O'Connor, Donald Griffith, Jacques Rupp. Animation: Julius Svendsen, Arthur Stevens, Jack Boyd, John Sibley, Eric Cleworth, Harvey Toombs, John Dunn. Backgrounds: Claude Coats, Donald Peters, Anthony Rizzo, George de Lado, Art Riley. Scientific advisors: Willy Ley, Dr. Heinz Haber, Dr. Wernher von Braun. Director of photography: William Skall, A.S.C. Film editor: Archie Dattlebaum. Narration: Dick Tufeld. Special processes: Ub Iwerks. Sound: C.O. Slyfield. Acknowledgements: U.S. Department of Defense: Army, Navy, Air Force.

MAN AND THE MOON

Produced and directed by Ward Kimball. Written by William Bosche, John Dunn, Ward Kimball. Music: George Bruns. Layout design: A. Kendall O'Connor, Frank Armitage. Cartoon animation: Julius Svendsen, Arthur Stevens, Joe Hale, Jack Boyd, Charles Downs, Conrad Pederson. Space paintings: Al Dempster, William Layne. Technical advisor: Dr. Wernher von Braun. Rocket ship crew: Frank Gerstle, Richard Emory, Frank Connor, Leo Needham. Production supervision: Harry Tytle. Photography: Edward Colman, A.S.C., Charles Boyle, A.S.C. Art director: Marvin Aubrey Davis. Set decorator: Bertram Granger. Assistant director: Robert H. Justman. Special processes: Ub Iwerks, Eustace Lycett. Special instruments: Maxwell Smith. Models: Wathel Rogers. Film editors: Lloyd Richardson, Sam Horta. Sound: Robert O. Cook. Acknowledgements: Griffith Observatory, Douglas Aircraft Company, Inc., Bill Jack Scientific Instrument Company, Protection, Incorporated.

MARS AND BEYOND

Produced and directed by Ward Kimball. Story by William Bosche, John Dunn, Charles Downs, Con Pederson, Ward Kimball. Music: George Bruns. Layout design: A. Kendall O'Connor, John Brandt, Tom Yakutis. Cartoon animation: Julius Svendsen, Arthur Stevens, Jack Boyd, Charles Downs, John Dunn. Space paintings: William Layne, Gordon Legg. Technical advisors: Dr. Ernst Stuhlinger, Dr. Wernher von Braun, Dr. E.C. Slipher. Models: Wathel Rogers. Film editors: Lloyd Richardson, A.C.E., Lionel A. Ephraim. Narration: Paul Frees. Special processes: Eustace Lycett. Sound: Robert O. Cook. Production supervision: Harry Tytle. Acknowledgement: Lowell Observatory.


money was spared to make the shows as good as they could possibly be. Costs ranged from a low of \$250,000 (for the second show) to a high of \$450,000 (for the third one), with a total of \$1,000,000; as a comparison the three Davy Crockett shows the first season cost in the neighborhood of \$800,000. Third, time was not a factor. According to Bosche, "Walt afforded us the luxury of time to really develop these things, to work with von Braun and go as far as we could. There was nothing in them that we didn't develop further because we didn't have the time. We took it as far as we could take it." Fourth, Ward Kimball and his crew were given free rein. Kimball recalls:

The crazy thing about these shows was that we had relatively little input from Walt. Because he was so busy with Disneyland, we got away with things I am sure that if he had been riding herd on it as much as some of the other projects that came before or after, we probably wouldn't have been able to get some of those things in the pictures. There were

things you couldn't explain to Walt. There were things that he saw later that he just thought were wonderful, but we all agreed that had we put them on a storyboard and tried to sell them, he'd have kicked them out. But once they were done he could see it. There were a lot of things in those shows that you couldn't explain with a storyboard treatment, and so we were fortunate in that respect. Even though he okayed the final story treatments, he went with our judgment for the details.

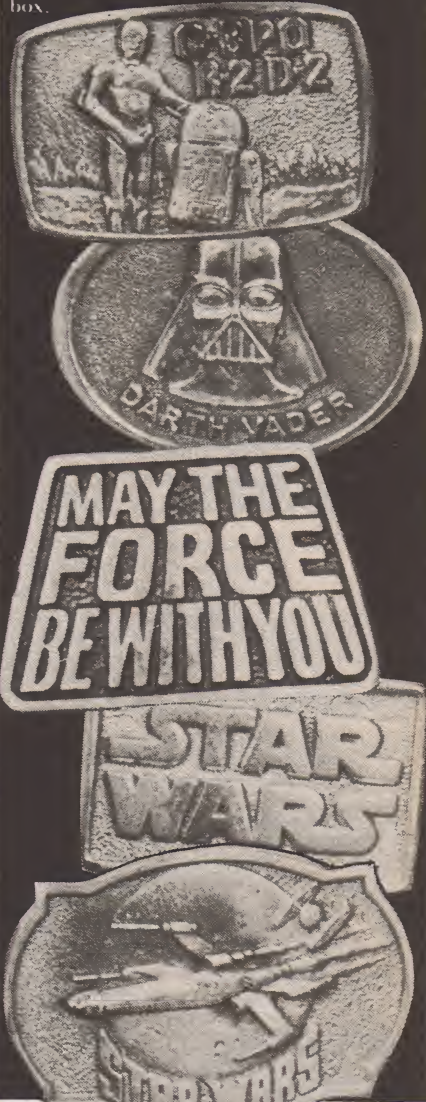
Kimball recalls when they first ran "Mars and Beyond" for the Disney staff in the Studio theater, "Walt was there; he sat in the back row. I sat next to him and when that cartoon section started coming on—the life on other planets—the whole theater was laughing. He turned to me and said, 'How do you guys think up all that crazy stuff?' That was a great compliment." Walt Disney's statement underlines a final reason for the success of the shows, and that was that Ward Kimball was the director and that he had put together an especially qualified group of men to work with him. Bosche affirms, "Ward was one of our real talents around here; in some ways he worked like Walt did. He would delegate things but he was always the director. He knew what he wanted but he let you develop it. He could see when it was working and when it wasn't." The combination of these five reasons spelled success.

It is interesting to note how closely the Disney space shows predicted events of the next few years. Of course, there were differences in the hardware, but the principles and the calculations turned out to be correct. There weren't any big surprises. If anything, the predictions of von Braun, Ley, Haber, Stuhlinger, and Slipher were too conservative. In visualizing the need for trips to the moon and Mars to begin from a space station, they had not imagined rockets the size of the Saturn 1B or the Saturn 5. It turned out that Dr. Haber had been more concerned about the problems of weightlessness, cosmic rays, and other physiological hazards than he needed to be. The timing was also a bit too conservative; no one guessed in 1955 that man would be walking on the moon a mere 14 years from the date of the first Disney space show. The Disney space station was certainly a forerunner of 1973's Skylab, and von Braun's winged fourth stage certainly brings comparisons with today's Space Shuttle.

The Disney space shows had been monumental efforts and they were greeted with enthusiasm throughout the world. Perhaps they did do their small part in speeding up the American space program. At least, Wernher von Braun never forgot the boost they had given his efforts. On the day that Apollo 8 first circled the moon, he placed a telephone call to Ward Kimball, saying, "Well, Wahd, it looks like they're following our script." 

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Body By Burman

The malevolent Misquamacus, a 400 year-old Indian medicine man, is reborn with creative care at the hands of Tom Burman, master makeup craftsman.

Photos: © AIP



Misquamacus, a 400-year-old evil spirit is reborn in William Girdler's, *The Manitou*. The physical creation of the manitou was assigned to the skilled hands of Tom Burman, who had created the little ETs for CE3K. Above: After applying the facial prosthetics, the torso is built up. Below: Lower torso application. "It's very difficult to design prosthetic pieces that move, bend and wrinkle naturally," says Tom Burman. "Also the anatomy had to be exaggerated—they wanted a very 'ropey' look to the muscles. It was very difficult to incorporate that look and still make it functional." Once the final visualization was agreed upon, a positive cast had to be constructed of the actor's body, the *entire* body—head, hands, feet, everything! The hands, feet and face were cast in the standard alginate material. The body cast was taken with plaster bandages. First the actor was coated with vaseline, then plaster bandages were applied directly to the skin. "We marked the body at half way points with indelible pencil."



Above: "I think he wore more individual prosthetic pieces than anyone else has," says Tom. "There were 36 pieces, including wig, scleral lenses, and teeth." Felix Silla and Joe Gieb played the role.




Left: Detail close-up of the process of overlapping two appliances. Below: The application took five, sometimes six hours to complete. Of the manitou actors Tom says: "They were the most cooperative subjects I've worked on — never complained at all. I would have cried like a baby if someone had done that to me!" The body cast was made in sections that would fit back together to form a shell. A plaster positive was then cast from the negative plaster bandage sections. "The biggest problem once the makeup is assembled is the movement of the body causing the appliances to break loose from the spirit gum. You have to do constant repair work."



Below and bottom: Application detail of lower abdomen. Note how the design seeks to elongate the upper body, torso and abdomen. What is it like to be covered in prosthetics? Hot and sticky. "Of course the actor was covered from head to toe with spirit gum, but we've tortured other people that way, too. We used a layer of powdered grease makeup over the actor's skin to protect it from the spirit gum, giving a little moisture protection to the skin."



Above: The foamed latex is pre-colored to the desired base shade. Then highlight and shadow is added after the application to the body has been completed. Each prosthetic was used just once. The sequences involving the manitou in makeup took about 7 or 8 days to complete and received an ovation of appreciation from the crew. 

Photos: © AIP

WET ALIENS

(continued from page 53)

powerful intellect, are responsible for telepathy, and this also seems true in human-dolphin mental contacts. People who see dolphins as highly intelligent are more open to psychic contacts than those who regard them as big fish; familiarity with dolphin ways also increases the likelihood of interspecies ESP. People who have had psychic experiences with dolphins find them difficult to describe.

Don't rush down to your local oceanarium expecting to pick up dolphin brainwaves, however. While you *might*, it is highly unlikely, unless you're exceptionally psychic. As Dr. Lilly discovered, captive dolphins are a different breed from their wild counterparts. While some thrive in captivity, many more have died from it, and the survivors frequently display spirits broken by the rigorous behavior-modification techniques used to produce oceanarium shows. Conditions vary greatly from one establishment to another: some take great pride in maintaining healthy, happy specimens, while in others the death rate is staggering. Stories of trainers mistreating their dolphins out of malice or ignorance are confined to backroom discussions, where the public can't overhear. Some-

times the dolphins bear mistreatment stoically; sometimes they retaliate! Some dolphins have been kept for years in lagoons with nothing more than a line of floats keeping them in; others have ripped steel fences apart to escape! It's impossible to generalize about dolphins for the same reason it's impossible to generalize about humans: no two are alike.

But there is no doubt that the "happy dolphin" image perpetuated by oceanariums and the media is a lie. The *Flipper* series shows them as happy-go-lucky Stepin Fetchit-types, fawning all over their human masters, Kenny and Bud. The only thing missing was the watermelon. The movie *Day Of The Dolphin*, while somewhat more realistic, still showed dolphins as being childlike, naive, and gullible. Trainers know better: dolphins can be sweet, even sexy, but they can also be deceptive, arrogant, and demonically cunning. The recent movie *Orca, the Killer Whale* did little to change the image of the most maligned creature since the snake. Although the orca saves the heroine, Rachel Bedford (a sympathetic biologist played by Charlotte Rampling) from a shark at the beginning, and spares her life at the end, in between these chivalrous deeds it devours Jack Campbell's (Richard Harris') crew, sinks a fishing fleet, sets a town on fire, and rips a woman's leg off! Dino De

Laurentiis would be well advised to restrict his swimming to pools from now on.

Paul Spong, a Canadian biologist who has studied orcas for the past six years, knows better. When a group of orcas swim by his research station in Albert Bay, Spong may hop into a one-man kayak and paddle out to meet the "deadly" killer whales. When he plays his flute to them, the whales stop roaming and listen raptly. If we stop to think about it, aren't humans the *real* monsters? Orcas are captured for oceanariums with concussion grenades, and catchers show no qualms about breaking up schools that may have existed for centuries.

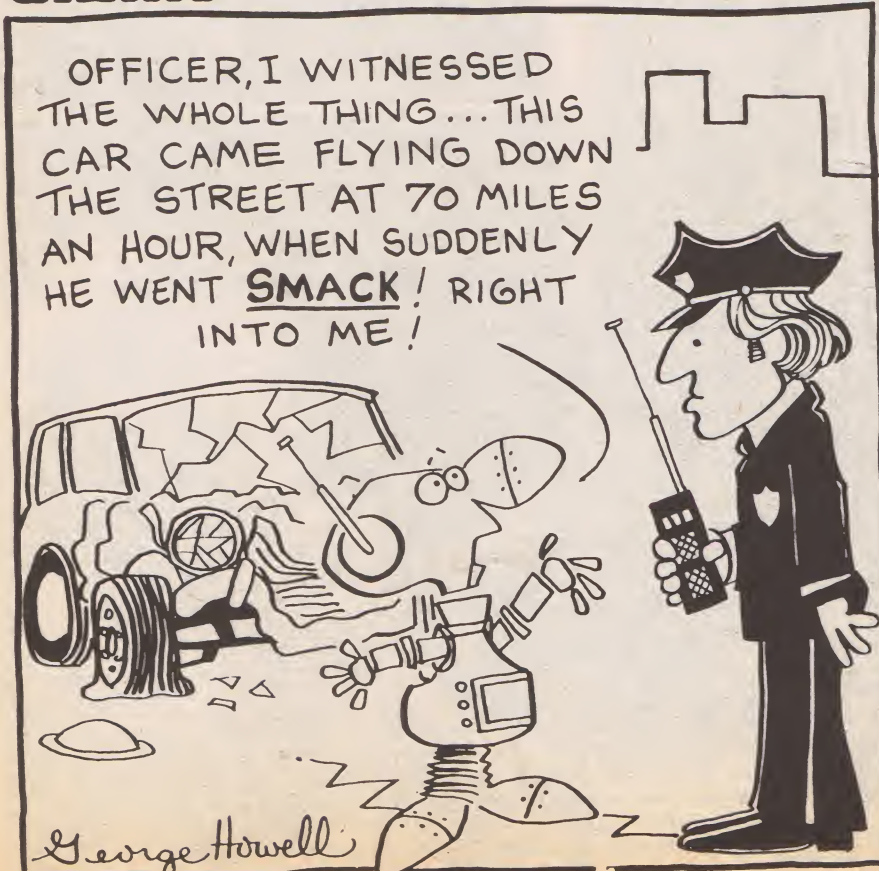
The future holds greater promise for interspecies communications. While the scientific community wrangles, several groups are planning to decipher the dolphins' language. The Dolphin Embassy Project, based in Australia, is headed by Doug Michaels, of San Francisco. This group is building a ferroconcrete "floating embassy," loaded with electronics, which will function as a meeting place where humans can observe and interact with wild dolphins along the Great Barrier Reef. Plans call for the expedition to begin in April, 1978. Members of the Canadian Greenpeace Project have, for the last several years, been literally laying their lives on the line to save the great whales. Using rubber Zodiac boats operating from a converted fishing vessel, Greenpeaceers have been harassing Soviet and Japanese whaling fleets in the North Pacific, gathering evidence of illegal undersized kills and producing a documentary film. On two occasions Russian whalers have fired harpoons at whales the group was guarding, narrowly missing the humans!

Dr. Lilly, too, is returning to the dolphins with a new plan. He is programming a sophisticated computer to act as a human-dolphin translator, linked by radio to communications equipment in a sailboat. Lilly hopes that, by working with wild dolphins, he will both avoid the problems that plagued his earlier work, and vindicate his theories.

If any of these groups are successful, the benefits to humanity could be endless. We will have established communication with minds perhaps greater than our own; we will receive an outside view of ourselves from creatures who watched us evolve. The dolphins and whales could help us control ocean pollution and aid in the search for undersea energy sources. They might be able to shed some light on the persistent myth of Atlantis. And who knows? By the time we encounter *real* aliens from outer space, we humans might be able to say "Hello!" to them in their own language—with the smiling dolphins by our sides. E

Gizmo

By GEORGE HOWELL



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Model Animation, "The Fly," Harlan Ellison Interview, Sat. A.M. TV, NASA Space Tix

No. 9 —
Interviews: Pat Duffy, Lynda Carter, Shatner, Jared Martin, Fantastic Journey Guide, Star Wars, 50s TV SF

No. 10 —
Asimov, Close Encounters preview, SF-Rock, SF Merchandise Guide, Interviews: Harryhausen, Bakshi, George Pal

No. 11 —
The Prisoner, Computer Games, The Superman movie, Incredible Shrinking Man, SF FX: The Makeup Men, SF Comics

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Extraterrestrial Life: Where Is Everybody?

The results from the Viking search-for-life experiments on Mars will undoubtedly continue to fuel fierce debate among exobiologists for a long time.

For science, the discovery of life on Mars would have been a momentous achievement, adding immeasurably to our understanding of the nature of living beings on Earth and the origins of life in the universe. For humanity at large, it would have been a monument to our time with lasting impact on our view of nature and our philosophical beliefs. As it is, one of the greatest scientific and engineering enterprises of the 20th century has yielded results that, in their final consequence, are neither positive nor negative but *inconclusive*—and very definitely far from final.

While the Viking robots may have dealt a crushing blow to any overly optimistic speculations about the existence of Martian life, the search for extraterrestrial life goes on unabated, perhaps even with increased vigor, driven by the immense importance to humankind which a positive result would have. With highly complex organic molecules, possible building blocks of life, being discovered constantly between the stars by radio-astronomy, exobiologists view life in the universe today as a common occurrence. Since conditions in the immense reaches of the cosmos are increasingly found to be similar to the conditions that prevailed on Earth when life originated here, they think that the universe must be teeming with it.

Man's conviction about the existence of other life forms beyond Earth is not a development of our modern, scientific age. As early as in the 4th century B.C. the Epicurean philosopher Metrodorus wrote:

"To consider the earth as the only populated world in infinite space is as absurd as to assert that in an entire field sown with millet only one grain will grow."

Unfortunately, *evidence* is still lacking. Exobiology remains a science that "has yet to demonstrate that its subject

matter exists," as paleontologist George Gaylord Simpson put it. In the absence of life forms other than those on Earth, all discussions about extraterrestrial life can only be speculative.

What makes the problem so troublesome is the random nature of biochemical evolution itself. We know that for life to emerge, matter must interact in all three of its basic relations: gravitational, nuclear, and chemical. While gravitational interaction, described by Newton's law, is simple to predict, and nuclear interactions, despite their very great number, also can be listed in all possible ways, the number of chemical reactions, both organic and inorganic, is so astronomically high that the prediction of the evolution of living organisms is an impossible task. The definition of a living system, thus, is saddled with a certain degree of subjective quirkiness, to say the least.

Without ignoring the possibility that totally unearthly life forms could exist in the universe, our search for extraterrestrial life will be of considerably less speculative nature if we restrict it to biological forms known, beyond the shadow of a doubt, to exist in the universe—namely, creatures on Planet Earth, built from carbon-containing molecules and water.

In the absence of any clear evidence for or against the occurrence of extraterrestrial life forms, scientists had to begin their search by falling back on deductive logic based on statistics. The game of juggling the combination of the various astrophysical, biological, and social developments in Creation which are presumably necessary to biological evolution began. The overall estimate is obtained by multiplying the many conditional probabilities of these outcomes, but there is a catch: in multiplying odds we are also multiplying possible goofs in our estimates, and so the likelihood of arriving at a second conclusion decreases as we proceed.

There are about 200 billion stars in our galaxy alone—and there are at least a million other such galaxies in the universe. But how many of those stars have planets with a mass not excessively different from that of the Earth, with an adequate axial rotation and an atmosphere? How many lie in a temperature zone permitting sustained carbon/water-based life, i.e., not too far from

its sun to be permanently frozen nor too near it for its surface to be scorched?

Life on Earth took an estimated 4 billion years to evolve from the earliest molecular system which we must call alive, to present-day humans. Prior to that, spanning at the most about one billion years, there was a period of chemical evolution, preceded by the initial condensation of the sun and its planetary system from glowing stellar gas. Thus, life must have originated hard and fast as soon as conditions were right—additional evidence for its suspected abundance in the universe—but it took many billions of years to evolve through its random processes of mutation and selection. Hence, we must look for stars that shine dependably and steady, retaining a constant radius and luminosity by turning hydrogen in nuclear reactions into helium over many billions of years.

Another possible limitation is the existence of multiple stellar systems, especially binary stars which consist of two stars revolving around each other at distances ranging from virtual contact to half a light-year or more. They are quite frequent: it is known that at least half the stars in the solar neighborhood are binary systems. To permit stable planetary orbits, the two stars must either be quite close together or very far apart. Because of the complicated orbits that satellites around many of these double stars would have, they may be less suitable as life-bearing planets.

Are single stars always accompanied by planets? There is no definite answer but the currently valid theory of the origin of stars would suggest that planetary systems are widespread. Planets form from dust and gas that is either left over from the process of star condensation or that has been acquired from the gases in interstellar space. If the dust/gas cloud is massive enough, another star could form instead of planets, creating a binary system. Thus, planetary systems and double stars appear to have the same origin. Since binaries are very numerous, planetary systems should also occur frequently. It is likely that the majority of all single stars plus many double stars have planetary systems, and we are probably quite safe in assuming, for statistics' sake, that each star (on the average) has one habitable planet.

Jesco von Puttkamer is Program Manager of Space Industrialization and Integrated Long Range Planning Studies at NASA. He is also the science advisor for Paramount's forthcoming Star Trek movie.

But what are the chances that life would indeed develop on such a planet, and that it would evolve into a civilization of intelligent beings? Estimating of these numbers is an even less definite exercise. But scientists today see life as a common occurrence in the universe—in fact, amino acids, the building blocks of life, have been found in space, and perhaps even life itself may have formed not on Earth at all but out in space in the stellar nebula during the formation of the solar system. It is likely that the appearance of intelligence, as a selective advantage of evolution, is the rule rather than the exception in the life history of a planet.

In a "Cultural Evolution Workshop" in 1975, chaired by Joshua Lederberg, scientists from NASA and various universities agreed on a value of 10^{-2} or greater for the fraction of living species in space that develop both intelligence and a technology corresponding at least to the electromagnetic communication phase. In other words: better than one in one-hundred.

With 200 billion suns in our galaxy, of which the oldest are about 12^{18} billion years old, the average rate of star formation over the galactic history must have been about 10 stars/year. Applying our odds from above, we would then arrive at the conclusion that every 10 years *one* civilization must have appeared (10 stars/year \times .01 civilizations/star.) If we further assume that after the birth of the universe in the "Big Bang" it took 5 billion years for conditions to settle down enough for life to burst forth, we are left with 10 billion years during which as many as *one billion* civilizations could have appeared. How many supercivilizations (i.e., civilizations that are substantially in advance of our own), then, exist in our galaxy today?

That number obviously depends on the average lifetime of your typical civilization and, thus, on how much faith one has in technological intelligence. Our species has managed to survive 33 years since the development of the A-bomb. Can we make 100 years? What if the average life of a technological civilization cannot exceed 100 years because of self-destruction in one way or other? There would then be only 10 coexisting civilizations in the entire galaxy!

What do exobiologists think? The opinions differ widely, but leading U.S. and Soviet scientists, like I.S. Shklovskii, Carl Sagan, Frank Drake, Cyril Ponnamperuma, Melvin Calvin, N.S. Kardashev, Joshua Lederberg, and A.W. Cameron, to name just a few, generally agree on a 'best guess' of one million civilizations at or beyond our present level of technological development, based on a mean longevity of 10^7 years.



Courtesy: Smithsonian Institution

Visitor participation is requested at the Smithsonian's Air & Space Museum for two exhibits, "Pick A Star," and "Pick A Planet." At the press of a button visualizations of possible life or planetary surfaces are displayed on the screen in color.

The central question and main dilemma today, first expressed in this form by Enrico Fermi, is, "Where is Everybody?" Civilization appears to be a universal phenomenon, and yet there are no currently observed signs of the cosmic activity of intelligent creatures. If there are at least one million supercivilizations in our galaxy alone, how can we explain the conspicuous absence of what Shklovskii has called "Cosmic Wonders"?

One answer has to do with the sheer size of the Milky Way galaxy. If one million civilizations are distributed randomly through space, the distance between us and the nearest of them would be *about 300 light years*.

Another possibility is that supercivilizations may pass relatively rapidly through the stage where they radiate observable electromagnetic energy into space; even on Earth, we are approaching the time when such advances as cable-TV and communications satellites with directed spot-beams will reduce sharply the amount of signals sent wastefully into outer space.

Thirdly, would we recognize intelligent cosmic activity when we see it? What exactly *is* life, what is intelligence?


Or—worst of all—the answer may be in our table above: lack of longevity of civilizations.

The possibility of receiving signals from extraterrestrial communities is one of the most intriguing problems raised by modern science. What are those signals, where and how are we to look for them, and should we devote time and effort to this search? The success of exobiology in solving its fundamental prob-

lem, to prove the existence of extraterrestrial life, depends largely on the level of our space technology. But are we ready? Contacting intelligent beings on another planet is undoubtedly the most fascinating aspect of space exploration, but what are the chances of success? There are 14 stars within a radius of 22 light years from our sun which may have inhabited planets (out of 111). Can we ever reach any of them? What about inter-stellar flight between civilizations? And would first contact, at least at the present critical stage of our development, have a beneficial influence on humankind—or harmful? It's an area of inquiry which is as full of the stuff that wild-eyed fantasy is made of as it is braced with realistic, but exciting facts. We'll examine some of it in the next issue of FUTURE.

For now, one final thought about our own existence and destiny: What if we are being too humble by assuming that ours is only a rookie civilization in a universe populated with a million or more supercivilizations? In our preceding analysis we used a rate of star formation averaged over the age of the universe, but in reality the number of suns in the beginning, billions of years ago, must have been quite small—and so may have been the opportunities for life to evolve. Maybe conditions for life, too, were unfavorable for longer than we have assumed above; maybe the threshold was not 10 billion years ago but more like 5 billion years. Then ours could be one of the very first planets with life in the universe, as Krafft Ehrlicke has pointed out. We could be privileged to be among the earliest intelligences, standing in the dawn light of life in the universe.

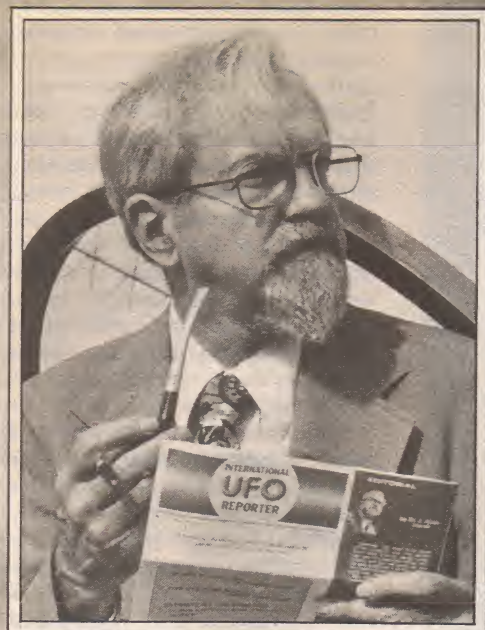
And the vigorous emergence of millions of other civilizations may take place in the billions of years to come—opening for us a future of truly breathtaking magnitude.



He used to 'invent' the official Air Force explanations for UFO sightings, now he's not so sure. The legendary UFOlogist speaks his mind . . .

THE UFO STORY

An Interview With
DR. J. ALLEN HYNEK



A photo taken by a 13-year old New Jersey UFO observer in March of 1966. Insert: Dr. J. Allen Hynek on the CE3K set.

By ED NAHA

As *Close Encounters Of The Third Kind's* majestic mothership touches down, and Steven Spielberg's fictitious crew of government officials tentatively steps forward for the ultimate encounter, a familiar face is readily spotted in the crowd, a face often seen on TV screens, book-jackets and magazine covers—Dr. J. Allen Hynek. When Steven Spielberg decided to bring his epic UFO saga to the screen, there was only one man he wanted to act as technical advisor on the controversial project, the equally controversial Dr. Hynek. In both real and 'reel' life, Hynek's interest in unidentified flying objects is near legend. Perhaps more than any other man alive, Hynek is considered *the* scientific figure synonymous with the term "saucer research."

A professor of astronomy at Northwestern University in Evanston, Illinois, Dr. Hynek has been involved with the UFO phenomenon for over twenty years. In the late 1940s he joined the Air Force team in its investigations of flying saucers. Leaving government service during the final days of Project Blue Book, Hynek embarked on a privately financed research program. This move would eventually result in the creation of The Center For UFO Studies—a non-

profit organization which, to this date, has recorded over 80,000 UFO sightings.

During the course of his notorious career, Hynek has been branded everything from a saucer debunker (which he was) to the patron saint of the pro-UFO team (which, he hopes, he is not). In New York to talk about both *Close Encounters* and his books *The Hynek UFO Report* and *The UFO Experience*, the professor is obviously taken aback at the number of people he has met who are ill-informed about both the history of UFO research in the United States and his own role in that melodramatic tale. In essence, the astronomer is the *only* individual to be involved with the strange phenomenon from the first days of Air Force Inquiry in the 40s to present-day private research.

He is not at all adverse to recount the history of UFOlogy. In between TV interviews and promotional chats, he recalls the origins of this modern shibboleth. "It really started towards the end of the Second World War," he recalls. "There were numerous reports about 'foo fighters,' luminous balls of fire that seemed to follow planes. No one has ever explained them. At that time, they were just regarded as being 'one of those things.' Then, in 1946, there was a spate of 'ghost rocket' sightings in Sweden. Since they were all seemingly traveling in the same direction, they were ascribed to Russian experiments."

The first "real" UFO sighting, however, occurred in 1947. "Kenneth Arnold on June 24th, near Mt. Rainier,"

Hynek recalls. "This sighting coined the name 'flying saucer,' because of Arnold's description of the sighting. It turned out that there were other similar cases that had occurred before June 24th that did not come to light until later because, well, who was going to talk about such things? In the summer and the fall of '47, various UFO reports began to come in to air bases. Why air bases? Well, that seemed a logical place to report them. UFOs were in the air. Who was better equipped to handle it except the Air Force? They have charge of the air."

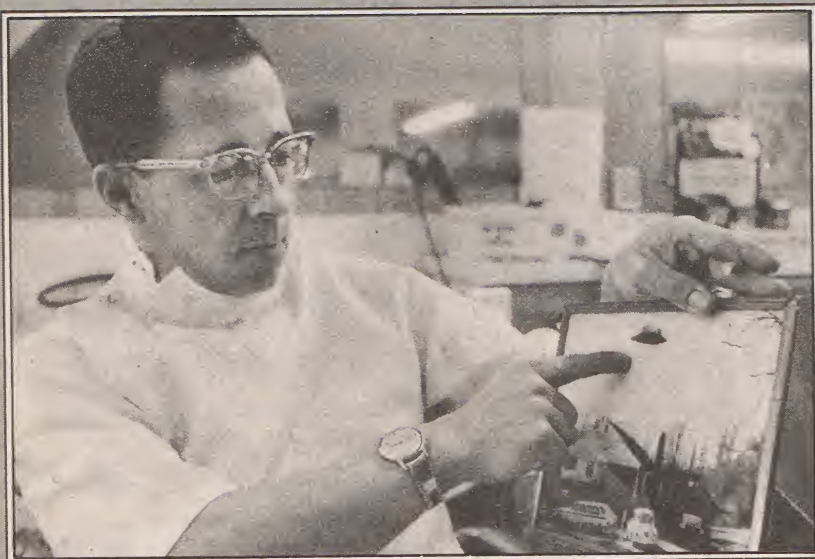
This was the beginning of official government activity. "At the Wright-Patterson Air Force Base in Dayton, Ohio, there was a division called the Air Technical Intelligence Center (ATIC). It fell to them to investigate the sightings. The original UFO reports were quite sketchy and none of the witnesses were really investigated, they were merely regarded as oddities. This cavalier attitude continued until someone in the Air Force decided that these reports might have to be taken seriously. After a certain exchange of letters between the Pentagon and ATIC, a UFO project was set up: Project Sign."

Immediately, the classified project aroused controversy within ranks. "There were two factions," stated Hynek. "Those in the Air Force who took UFOs very seriously (because they thought they might be a Russian secret weapon or worse) and those who thought 'well, the way saucers are described in terms of acceleration and maneuverability, there is no way they

Above left: During the colorful finale of *Close Encounters Of The Third Kind*, UFOs of every size and shape buzz a government base. All the UFOs used in the film were patterned after actual eyewitness reports of "real" UFOs.



A photo taken of a "real" UFO clearly shows why most pictures of saucers are not used as "hard" evidence. Note the fuzziness of the flying image.



Zanesville, Ohio barber Ralph Ditter points to an object he sighted on February 6, 1967. He used a Polaroid to take this snapshot.

UFO TALK

Angel's hair: A white, stringy substance allegedly dropped from the heavens by passing UFOs.

CEI: Close Encounter Of The First Kind: the sighting of a UFO.

CEII: Close Encounter Of The Second Kind: a sighting where physical evidence is introduced.

CEIII or CE3K: Close Encounter Of The Third Kind: A sighting wherein there is actual contact with the occupants of a UFO.

Daylight Discs: UFOs spotted during the day.

Flap: A wave of UFO sightings occurring during a short span of time.

MIB: The Men In Black: mysterious, black-

clad strangers who arrive shortly after a saucer sighting to both harass sighters and dispose of any physical evidence left behind.

Nocturnal Lights: A night-time sighting of a luminous UFO.

Radar-Visual: A UFO sighting which is simultaneously tracked on radar as it is being viewed by the naked eye.

Skyquake: A recent phenomena along the eastern seaboard wherein unexplained sky tremors are recorded, sometimes accompanied by strange lights. UFOlogists see some link with UFOs.

UFOlogy or UFOlogy: The study of Unidentified Flying Objects.

can exist.' This was the beginning of the official debunking school.

"When Project Sign was in progress, I was asked (being a nearby astronomer) to act as an astronomical consultant, to see how many UFO reports could be explained in terms of astronomical occurrences. You know, meteors and the like. The idea intrigued me, although I was very skeptical of the whole saucer thing. I joined Sign as a consultant which meant that once or twice a month, I'd go into right field and look at the reports that came in and decide which ones I could explain astronomically. I prepared my report on the 243 Sign cases using only the reports as evidence. There were no real funds to go out and investigate.

"My conclusions were very negative. While I admitted that there were a number of cases, nearly twenty percent, that didn't seem to have a rational explanation, I was so taken with the idea that they *had* to have rational explanations that I made up all kinds of excuses. I even called one sighting an 'atmospheric eddy.' I have no idea what one is. Ridiculous. But it showed you my frame of mind. I was hell-bent to arrive at normal conclusions."

During the course of his report, Project Sign became Project Grudge. "That was really a signal that the Air Force debunking faction had been taken over," explains the astronomer. "At that point, Grudge adopted a firm policy that *everything* had to be an explained phenomenon. There could be no such things as UFOs. Their scientific advisory board said that there could be no such thing. The scientific establishment said that there could be no such thing. It can't be—therefore it isn't!"

Grudge quietly faded from view as the public apparently lost interest in saucers. "By 1951, I thought the UFO issue was dead. Then, in July of 1952 came a tremendous flap of sightings over Washington D.C. There was such a spate of reports that, for a few days, military wires were absolutely clogged. This caught the attention of the CIA, who didn't like the idea of UFOs.

"They weren't afraid of UFOs. They were afraid of UFO reports and how they could be used to subvert national security. If some nation wanted to launch another Pearl Harbor, they might have their agents spawn a host of UFO reports just to confuse the military situation. In January of 1953, the CIA arranged for the creation of the Robertson Panel. I was an associate member. They studied a few select cases for a few days, not really going into them. The panel's findings encouraged official debunking but did *not* say that there were no UFOs. They pointed out that 'in these perilous times' UFOs could be a very disturbing public issue. They urged that the public be educated as to the types of things that *could* be

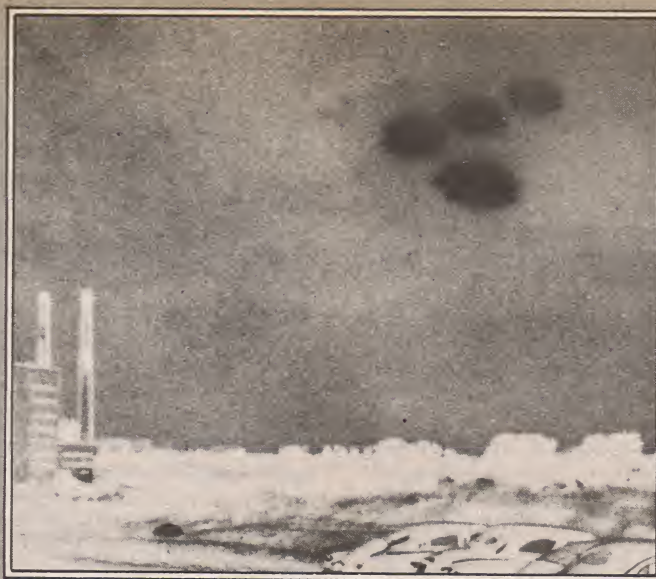
mistaken for saucers: clouds, stars, planes, the planet Venus and so forth. Had these recommendations been pursued and a real educational effort made, we might have been spared a lot of silly reports that subsequently made headlines. For instance, the public at large just doesn't understand about shooting stars. A person will call us up, even today, and say 'It couldn't be a star. It's flashing red, blue and green.' Of course, that's exactly what a twinkling star does on the horizon."

Because of the Robertson Panel's findings, the CIA's distaste and the scientific community's skepticism for the matter, Hynek found himself involved in yet another stage of UFO research. "The effort at right field simmered down to a very small effort headed by a captain—which tells you a lot right there. They had a job to do, which was mainly to keep the lid on UFOs, don't let it get out of hand. As part of that pursuit, they deliberately covered up the reports that came in. They would not release them to the press or call attention to them. The only time they released any information on sightings was when the press got there first. The press began to make things a bit difficult, asking questions. The Air Force would talk in a limited way, never saying it was a possible UFO, always inventing a rational explanation . . . which occasionally boomeranged when they overreached themselves."

According to the scientists, this behavior continued for years. "Reports would come into Air Force bases. The idea was that the reports were to be solved at the base level. The unsolved ones were to be forwarded to Blue Book for investigation. But, of course, passing the buck is great sport in the military and everything was sent to Blue Book. The great majority of cases were sheer nonsense, obviously misidentifications. My God! The number of people who don't know what a meteor is! The Air Force tried several times to get this monkey off its back, but there were no takers. They were stuck with it. It boiled down to a low scientific effort and a high public relations job. Eventually, some extraordinary sightings were reported. The Air Force, however, had adopted a party line and that's all there was to it.

"That's when I began having reservations. I was getting a little disturbed about the way some of the witnesses were being treated. I said that ridicule was not part of the scientific method and the public should not be taught that it is. Although I was still far from convinced that we were experiencing a physical visitation from way beyond, I was irritated by the cavalier manner with which the Air Force was treating the subject."

Hynek's dissatisfaction with the project crystalized with the "swamp gas"



These UFOs were sighted over a Coastguard base in Salem, Mass. on July 6, 1952. Experts believe them to be windshield reflections of light.



Sighted over Clemens, Michigan, in January of 1967, this UFO resembles a flying submarine. Other UFOs are saucer-shaped and cigar-shaped.



This Oregon sighting conforms with the classic "flying saucer" UFO shape. The term "flying saucer" was coined in the 1940s after the first sighting.

sightings of 1966. "That was the last time I tried to do right by the Air Force," Hynek smiles. "I pointed out that a certain amount of those Michigan swamp sightings could have been swamp gas. Well, that boomeranged badly. It embarrassed me and it embarrassed the Air Force. Just about that time, I decided to re-examine the whole issue. Take another look at it. I said: suppose I don't take the position that everything has to have an explanation. Suppose I take the viewpoint that there might be something to it. It was amazing. I read the same reports with two different pairs of glasses. When you read it as a skeptic, you latch onto any little thing that can be used as ammunition. If a witness says that the UFO sounded like a big wing flapping you say 'Aha! It was a bird.' If the UFO had tiny lights like an aircraft, you nod. 'It was undoubtedly an aircraft.'"

Hynek's objectivism didn't earn him any friends in the Air Force. "By 1969, I was fulfilling my duties and not speaking to anyone. The London Report said that UFOs didn't exist and Blue Book then folded. Things lay fallow for a while. Nobody was talking about UFOs. Reports were virtually nonexistent, now that the Air Force was out of it. But 1973 proved to be a boom year for flaps, especially in the southeast United States. Hundreds of reports. After the case of the alien encounter with the Pascagoula fisherman, I decided we would have to do something about UFOs ourselves. I almost singlehandedly waved my arms around and created The Center For UFO Studies, not as a UFO club or as a membership organization but as a loose association of scientists and technicians who are generally intrigued with the problem and want to look at it, do something about it.

"It's totally unfunded, getting all its contributions from the public. We make enough to pay a secretary, the rent and the telephone bill, but certainly not enough to do any serious science. But I thought at the time, at least we will have an entity that is viable, something to build from. Eventually, we became known as virtually the only place in the United States and, perhaps, the world where a UFO report will be listened to seriously, without ridicule, confidentially. We agree not to use people's names. In other words, we want to examine the phenomenon as a phenomenon. Gather data on it. Open a clearing house of information.

Hynek pauses for a moment, reflecting on the progress made at the Center. Of late, he has been lampooned for his organization's work and, frankly, that puzzles the astronomer. "I don't know whether it's our investigations that promote ridicule as much as the fact that we point out that sighting-reports exist!" he shrugs. "We do very little actual investigating on our own because we just

don't have the funds. We're actually in a holding pattern. We can keep the center alive so there will be a place where people can report, interesting a number of individual scientists in various fields. But we can't afford to travel to places on our own, to send out teams of investigators."

Hynek is at a loss to explain why UFO investigators are the target of so much sarcasm. Is investigating *this* well publicized phenomenon so entirely different than investigating a more palatable one? "If the critics don't think there is anything to UFOs," he points out, "why are they so concerned? Is it an ego trip for them? If some of the critics would stick to pointing out legitimate scientific explanations of UFOs, and attempt to educate the public scientifically, they'd do a great job. But, all too often, when they can't do something scientific about it, they resort to slander, to character-smearing. They say the town wanted publicity, or this man had been reading too many science-fiction books or he had seen too many movies."

In Hynek's mind, the modern school of UFO debunking is not all that far removed from the old Air Force train of thought. "During a period when a few planes crashed while chasing UFOs," Hynek recalls, "the answer the Air Force always gave me for the incident was that it was engine failure or pilot error. They would absolutely disregard the surrounding circumstances. In a sense, the critics are still carrying that idea out. It can't be—therefore it isn't!"


Currently making the television and newspaper rounds to promote *Close Encounters* and his UFO Center, Dr. Hynek is obviously frustrated by the skepticism of reporters and talk show hosts and by the dredging up (sometimes on coast-to-coast TV) of some of UFOlogy's more fantastic elements. Angel's hair. Killer Saucers. The mysterious Men in Black who threaten, and sometimes dispose of, saucer sighters. "How can I explain MIBs?" Hynek grows wide-eyed. "It's part of the festival of absurdity. I'm just wondering if the whole thing isn't some sort of fantastic psychic manifestation. It's so weird. Now, how the hell can there be things such as men in black? Yet they're reported. Now this sort of report irritates the hell out of me. And people have a good laugh over them.

"In one interview I had to say, 'Now look here, I'm not making these reports up, I'm merely reporting what is given to me. Take it or leave it!' I do not want to be put into the position of being the champion of UFO reports. I'm much more like a commentator, an observer. People just don't understand the research process, a detached scientific attitude. You either have to be for UFOs or against them. And, damn it,

I'm neither! It's like a zoologist going to Brazil and classifying different kinds of beetles. He's neither for nor against them. He just wants to find out what kind they are."

Hynek relaxes somewhat. It is clear that his role of casual observer has been misinterpreted, and that to some people it resembles a flying saucer cheerleader. Seated in a small office surrounded by *Close Encounters* memorabilia, the astronomer sighs. "My work gets terribly misunderstood," he admits. "And I guess being connected with the movie doesn't help any. It would be very nice for me to sit in an ivory tower and present an entirely objective, detached and scientific stand . . . but who would ever hear about it? Sure, you'd reach conclusions, but it would be for yourself—locked away in your little chamber, meditating on the topic and satisfying yourself. I decided that I wanted to go public with UFO research and mobilize interest in it. One of the main reasons I became associated with *Close Encounters* was that I hoped, after reading the script, that it would make *talking* about UFOs more socially acceptable. I wanted people who had held their UFO stories to their chests to be enticed out of the closet. I hope that the subject will be talked about enough so that people will feel that it's safe for them to report that *thing* that happened five years ago which they've carefully guarded as a family secret."

Despite the noble reasons behind his involvement with the movie, Hynek is aware that UFO critics insist that it will do nothing more than cause a sighting flap of imaginary Spielberg-saucers. "I hope the film doesn't make UFOs a popular fad. I'm watching it very carefully—newspapers, magazines, listening to conversations. So far, there haven't been any flap reports . . ."

The astronomer's voice trails off. It is late in the day. After being bombarded by a host of abrasive TV commentators, spaced-out saucer enthusiasts and hundreds of UFO-related questions, Dr. J. Allen Hynek leans back in a chair belonging to his book publicist, his suitcase nearby, and prepares for an evening flight to another town and another round of interviews. "I hope all this serves a beneficial purpose," he sighs. "I would really like to have the Center sink its roots sufficiently so that it becomes a viable and a stable organization. For years, scientific investigations of UFOs have been laughed at, called far fetched, misinterpreted. I believe that it's time for us to change our whole attitude and way of thinking. Unidentified Flying Objects are some sort of phenomenon. In order to get a clearer picture of their origins and existence, scientific examination and investigations *must* be carried out. Our organization is a start in that direction. And, with the public's help, it *will* develop." 

UFOs AT A GLANCE



Although strange shapes in the sky have been reported since the dawning of recorded history, it has only been of late that UFOs have come into their own. Here is a brief look at some of the flying saucer phenomenon's more noteworthy moments . . .

- 1942-45:** Glowing, circular "foo fighters" reportedly shadow World War II fighter planes.
- 1946:** "Ghost rockets" are sighted over Sweden.
- 1947:** The term "flying saucer" coined by the press.
- 6/47:** Businessman Kenneth Arnold, piloting a private plane, sights nine discs near Mount Rainier, Washington. Described

- 1950:** Rumor spreads that UFO crashes in Alamogordo, New Mexico. Two char-broiled, decidedly dead alien mini-pilots found inside.
- 1951:** Project Bluebook formed.
- 8/51:** Nocturnal saucers photographed over Lubbock, Texas.
- 7/52:** A series of radar detections occurring simultaneously with a flap of visual sightings over the National Airport in Washington, D.C. causes an uproar. Military is not amused. (The incident later inspires the film *Earth Vs. The Flying Saucers*.) The CIA, understandably worried, sponsors the Robertson panel—a group of scientists led by California Institute of Technology physicist H.P. Robertson. They conclude that 90% of saucer sightings are easily explainable.
- 1953:** The term UFO officially introduced to the public by the U.S. Air Force.
- 1953:** Project Blue Book astronomer Hynek publishes an essay in *Journal Of The Optical Society Of America* stating that UFO sightings should be investigated more carefully.


- 3/66:** In Portage County, Ohio, two policemen spot a UFO and become involved in a saucer chase down a deserted highway.
- 3/66:** "Pyramid shaped objects" spotted near a Dexter, Michigan swamp. Blue Book astronomer J. Allen Hynek is quoted as explaining the sightings as "swamp gas." The press has a field day, lambasting both the doctor and the Air Force.
- 10/66:** A mother and five children in Newton, Illinois watch a UFO float over their farm home.
- 1/67:** In Methuen, Massachusetts, a string of bright lights passes over a road, killing the engine of a car motoring below.
- 4/67:** More Swamp Gas reported in Michigan.
- 5/67:** In Colorado Springs, Colorado, radar tracks a large object which appears to "shadow" a commercial jet into an airport before veering off.
- 1968:** Air Force officials sponsor a study at the University of Colorado led by physicist E.U. Condon. 37 scientists study 59 sightings.



- them as looking like "a saucer skipping across water."
- 9/47:** Project Sign begins to investigate saucer sightings.
- 9/47:** Project Sign astronomer J. Allen Hynek explains saucer sighting of 8/47 in Twin Falls, Idaho as being an "atmospheric eddy . . ." a totally unknown meteorological occurrence. The Air Force accepts the solution.
- 1/48:** After a Louisville, Kentucky Highway Patrol reports sighting a saucer near Goodman Air Force Base, a group of four F-51 aircraft arrive. Three search for the saucer. One pilot spots it and pursues. "It looks metallic and it's tremendous. It's above me and I'm gaining on it." Moments later, the plane crashes, killing Captain Thomas Mantell. Official conclusions: Mantell died either chasing the planet Venus or a Skyhook balloon.
- 7/48:** Cigar-shaped object buzzes commercial airliner over Montgomery, Alabama.
- 10/48:** A dogfight reported over Fargo, North Dakota involving a National Guard pilot and a globe of light.
- 2/49:** Project Sign becomes Project Grudge.
- 8/50:** Saucers filmed in broad daylight over Great Falls, Montana.

- 10/54:** A cigar - shaped object drops "angel's hair" on Jerome, Ohio.
- 10/55:** Humanoid aliens shot at in Kelly Hopkinsville, Kentucky. Event witnessed by seven frightened Terrans.
- 9/57:** Saucer explodes in Sao Paulo, Brazil. Fishermen bring fragments to be analyzed. "Magnesium of higher purity than attainable in purification techniques known to man," is the verdict.
- 10/58:** In Loch Raven, Maryland, a UFO hovers over a car, killing the engine.
- 6/59:** Father Gill and thirty-eight witnesses encounter a flying saucer and three glowing aliens in Papua, New Guinea.
- 9/61:** Betty and Barney Hill abducted by tiny humanoid aliens and are examined by the creatures aboard a saucer. This New Hampshire sighting later inspires both a book and a TV film.
- 8/62:** Rivalino do Aleiua Mafra of Minas Gerais, Brazil reportedly attacked by a pair of pint-sized glowing spheres. He disappears in a cloud of smoke and is presumed dead.
- 4/64:** In Socorro, New Mexico, policeman Lonnie Zamora spots an egg-shaped craft landing. Two white-robed figures are seen nearby.

Small scout ships are preparing the way for the arrival of the mother ship in *CE3K*.

- 1969:** The Condon Report rejects ETH—Extraterrestrial Hypothesis. It declares no further investigations of UFOs are needed.
- 1969:** Project Blue Book closes shop.
- 12/69:** The American Association For The Advancement of Science holds a symposium on UFO investigation. No one can agree on anything.
- 1972:** J. Allen Hynek publishes a best seller: "*The UFO Experience*," introducing the public to the Close Encounters terminology.
- 10/73:** Charles Hickson and Calvin Parker are abducted from their Pascagoula, Mississippi fishing hole one night by a UFO. Three aliens interrogate them before dropping them off back at their fishing retreat.
- 1973:** Hynek begins his Center For UFO Study.
- 10/74:** A Wyoming hunter is kidnapped by a "yellow-skinned" alien.
- 8/75:** A UFO is reported over a nuclear power plant in Hanford, Wash.
- 9/75:** Woodcutter Travis Walton is abducted by aliens from his job site in Arizona. Startled co-workers take to the woods. 

tomorrow

Extrapolative projections into the future by today's outstanding visionaries

In an age of nuclear energy and potential nuclear destruction, of men on the Moon, Space Shuttles, planned cities in space, genetic engineering and SSTs, we seldom seem to realize that the most revolutionary technological changes of the past 25 years have not been in nuclear physics, biology, or space science but in media hardware and its utilization. Revolutionary in the sense of transforming our everyday lives, our civilization, our very consciousness. Few of us will ride in Space Shuttles or live in a city in space or walk on the Moon, though such was commonplace in the science fiction of the 1950s. But *no* science-fiction writer or filmmaker of the 1950s or 60s was seer enough to predict that the entire world would watch the first landing of men on the Moon on live world wide television. Buck Rogers had his ray gun, and Slans had their mutant powers, but how many science-fiction writers of yore equipped their heroes of the future with handheld computers the size of a pack of cigarettes?

The total media environment we live in today is just too far beyond the science fiction of twenty years ago to have been predicted by the best writers of those days. The transistor and then the microchip have created two successive revolutions in electronics, tremendous expansions in possible technologies, and equally tremendous compressions in size and cost. In your right hand you can hold a \$200 computer that twenty years ago would have filled a large room and cost millions. And in your left hand, you can palm a tiny self-contained \$400 color television set. In a year or two, they'll both be part of the same package.

In fact, the technical possibilities that have opened up in media electronics are so vast that we've hardly started to exploit them politically, socially, creatively and culturally. Only in the past two years or so have we even begun to realize how much we can do with the technology we already have in cheap abundance. Cable television systems. Home videotaping equipment. Handheld computers and electronic calculator watches. Programmable video games. Two-way television. Communications satellites. Table-top complete computer systems. Biofeedback. CB

radio. Moog synthesizers. Holography.

Our department stores are clogged with amazing electronic gimcracks, and now we're learning how to put all this stuff together in synergetic systems. As we do this at an ever-accelerating rate, we are in the process of creating a 21st century that will make those masters of 1950s superscience seem like country bumpkins.

The average American will, within the next half-century, have such an intimate relationship with the total media environment that surrounds him as to pass for an electronic cyborg.

In the living room will be four or five large television screens, a small typewriter keyboard, and a little all-purpose cassette player circuited into a computer about the size of a toaster-oven. The computer will wake you up in the morning with an invigorating electronic stimulation of your awareness center, put the coffee up to perk, and microwave you an instant frozen breakfast while it records the morning newspaper on either videotape, or, more likely, a magnet memory element that would record the Sunday edition of the *New*

Fact is, the average 21st century American may not know how to read at all. The written word will be strictly esthetic; it will no longer have any necessary function in a total media environment. However, the average ten-year-old will be able to interface with computers and media systems on a 1970s PhD level—and then some.

That complex sitting in every American living room—let's call it the "media net console"—is library, school, home computer, entertainment center, electronic memory unit, diagnostic computer, security system, bank, store, newspaper, musical instrument, accountant, home video studio, and about a thousand other things according to the whim and genius of its owner.

Basically the "net console" is a marriage of a world-wide, but also highly localized complex of television networks with miniaturized computer technology. With the keyboard (or, for the indolent, with a pre-programmed chip) you can order your computer to perform any function from turning the lights on and off at night to doing your income tax or monitoring your vital signs and remind-

Total Media Spinrad

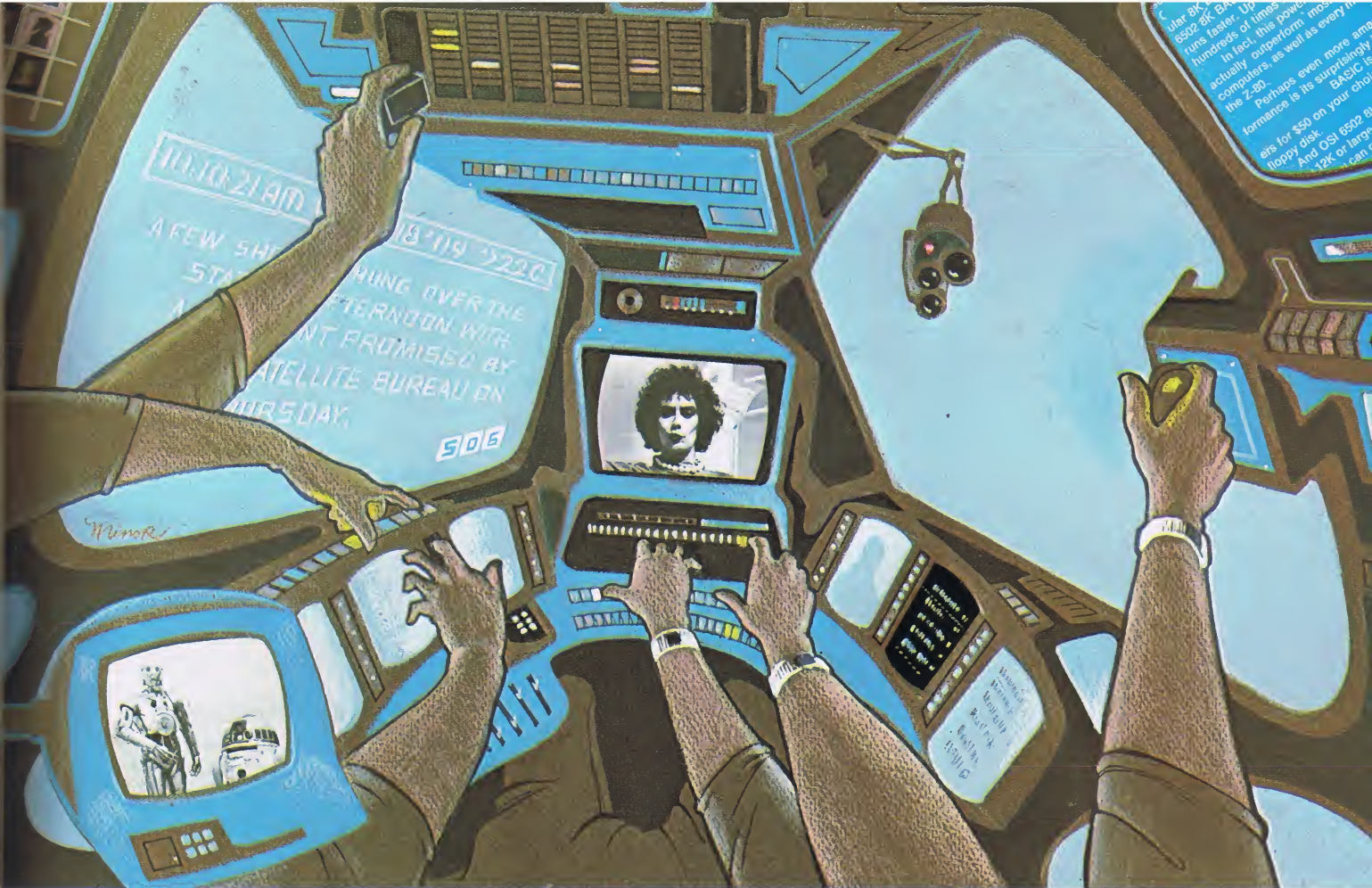


*Norman Spinrad has been known for his successful and controversial writing since he entered the science-fiction field with a story in *Analog* during the early sixties. Fifteen years later, he has contributed to every major SF magazine, has won several major awards, including the Nebula, saw publication of ground breaking novels such as *Men in the Jungle*, *The Iron Dream*, and *Bug Jack Barron*, and spent some time writing screenplays for television. Mr. Spinrad makes his home in the Greenwich Village section of New York city.*

York Times on a chip the size of a penny.

On verbal order, the computer will give you a quick scan of the paper on the auxiliary kitchen screen, and electronically turn to the sports page or the editorial columns for a quick old-fashioned print read. (Assuming, of course, that you're one of those effete 21st century intellectual types who believes that there's still some intrinsic value in primitive media like the written word.)

ing you when to take your vitamins. With the keyboard, and the appropriate programs, you can translate Russian into English, play Bach on an electronic analog of an organ, synthesize a sequel to 2001 to suit your own creative fancy, or play any game you like from chess to pinball to lunacy of your own invention. Hypochondriacs can spend endless happy hours with diagnostic programs. Anything you can think of to do with even the most advanced "modern" 1970s computer, will be available and second



"... The 'media net console'—is library, home computer, entertainment center, bank, store, newspaper..."

nature to the 6th-grader of the 21st century.

Only he won't be a 6th-grader because there won't be any schools.

When the programmable home computer is interfaced with the advanced 21st century media network, you get—*something else*. Something that makes schools, libraries, department stores, banks, money, legislative bodies, stock exchanges, telephones, and a hundred other 20th century necessities like written prose quite superfluous.

★ ★ ★

21st century television sets bring in a lot more than NBC, ABC, CBS, and a few local channels. Perhaps the ghosts of our present-day "major networks" survive in some mutated media backwater. But 21st century television sets, wired into local cable systems, bring in hundreds of channels of television output. The local cable systems are in turn receiving and rebroadcasting programming from many world television networks as well as taking care of local business like banking, shopping, and computer access.

The 21st century net console allows you to produce your own videotapes—with production values that a 20th century film studio would envy, and for

just the cost of the electricity to run the machinery. Bits of tape or even single images can be called up from the central computer library by the net console computer and recorded. With the console keyboard and computer, you can edit this material electronically, add an infinity of special effects, synthesize a sound track, maybe even play a scene yourself with the electronic ghost of Humphrey Bogart. Anyone can turn out broadcast-quality tape and show it to anyone who cares to call his communication channel number. Talent, as always, is the only limitation.

The personally-produced videotape will be the home movie, letter, obscene phone call, and even dunning notice of the 21st century. Godzilla, speaking with your voice, will demand that 50 bucks your friend has owed you for six months. As for pornography, well . . .

Two-way computer interfaced television will provide electronic banking, shopping, bill-paying, stock market transactions, education. Ultimately, it may very well replace government itself, or at the very least, Congress and the voting booth.

The instant electronic referendum will replace today's legislative process. All sides of any given issue will be given

temporary full-time television channels for a few days on which to present their cases as best they can. After they've all had their say—and been extensively questioned by the citizenry via two-way television—the entire population will vote "yea" or "nay" electronically and simultaneously. A thumbplate on your net console will check your unique thumbprint against the national memory bank and accord one input vote into the electoral computer to each unique thumbprint, thus preventing you from voting twice and preventing anyone else from stealing your vote. Then you simply press your "for" or "against" button and the electoral computer announces the results a nanosecond or two after the electronic polls close.

★ ★ ★

Well, that may all sound like a far distant yonder from where we sit today, but the fact is that as far as the hardware goes, most of it already exists today, and you can afford to buy an awful lot of it yourself. The next electronic revolution will be the software revolution, as we learn how better to play with our sudden cornucopia of electronic Christmas toys. Then we will really start to use them as tools.

Cable television systems are now


spreading throughout the land, and they already have the capacity to transmit scores, if not hundreds of channels of television into the average home. A device called Qube is being tested in Columbus, Ohio right now. It's a box with five buttons that lets you have some primitive input into the cable system computer, certainly enough for some tentative experiments in electronic voting. Instead, it's being used to experiment with the concept of "instant Nielsen ratings." What better demonstrates the current high level of the hardware, and the primitive state of our imaginative use of it?

For around \$1000 you can now buy any number of video recording decks that plug into your television set the way an audio tape deck plugs into your stereo system. For another few hundred bucks, you can plug your own cameras and microphones into the system, and if you buy a second video deck, you can edit tape, too. Which isn't a bad television studio for under \$3000.

For another \$300 to \$700, you can buy various typewriter-sized home computers that also plug into your television set and play program cassettes on an ordinary \$39.95 audio cassette player. As more and more programming cassettes get issued like record albums, your television system becomes a pinball parlor, a teaching machine, and a very sophisticated computer—for under \$4000. Soon to hit the market are other modules that plug into these home computer systems. Typewriter keyboards. High speed printers. Telephone answering decks. Moog synthesizer decks. Computer animation decks. Videotape editing decks. The fad gizmo of the week.

In a way, the state of hardware and software resembles the primitive beginnings of high fidelity sound systems, when hi-fi freaks put together unique systems out of their own favorite components, and in order to get it right, you had to be an electronic wizard. Today, of course, anyone can buy sound systems of superior quality in a department store with all the components maximally matched.

This, then, is the brink of where our new media technologies are today. In the next couple of years, some large enterprising company will no doubt combine home computer, video tape decks, two or more television screens, a cassette program player, and a keyboard into a handsome imitation Danish modern teak cabinet and sell the thing for \$3000 or so. A couple of years after that, you'll be able to buy the same package, minus the frills and cabinet-work for maybe half of that.

When these appliances start becoming as common as microwave ovens, then you'll know that the real media revolution has begun. 

perspectives

A few months ago we passed the twentieth anniversary of the dawn of the Space Age. In 1958, a modified Army Redstone rocket successfully placed into orbit a tiny package called Explorer. It was the Earth's third man-made satellite, the first two having been launched by the Soviet Union several months earlier. The Russian payloads were much more impressive—the second Sputnik even had a canine passenger.

The smaller Explorer had only one experiment aboard, but it was responsible for the first major discovery about the Earth made from space. The relayed frantic 'pinging' of an onboard geiger counter revealed that the Earth is surrounded by rings of radiation. These are the Van Allen radiation belts, named after the scientist who devised the simple experiment.

Eleven years later mankind reached out with curiosity and ingenuity and took its first 'giant step.' But a 'giant step' toward what? Even though the first reusable spacecraft, the Space Shuttle, is about to become an operational vehicle, the government seems determined to step-down our involvement with the exploration and development of near-Earth space.

NASA had originally planned to build a test model (the *Enterprise*) and a fleet of 8 additional Space Shuttles. The government saw that as an uncalled-for expenditure, and the figure got knocked down to 5. And now the Carter administration has taken a new look at our goals in space, and the shuttle force has been cut back to 3—plus the experimental *Enterprise* which will be re-fitted and made operational.

The contributions that space exploration have already made to our society are staggering, including dozens of new technologies and hundreds of new businesses. Space-age hardware is responsible for everything from teflon to microcomputers, from finding new oil deposits to advance storm warnings.

Communications satellites have influenced political events, changed the course of wars, and can make important information available to people in even

the most unreachable places. A few years ago we orbited Skylab—the first functional space station. Nine men spent a total of 171 days aboard, covering more than 70-million miles and proving that space can be made habitable (and with time, hospitable) for Man.

And now, as we are about to cross the threshold, we seem to be pulling back from space . . . put off, perhaps, by fears of how much time and money continued development may take. But these fears are irrational. In 1960, when President Kennedy declared the landing of a man on the Moon by the end of the decade to be a national goal, most people—even most scientists—scoffed and called it an impossible dream. Yet the precision and accuracy of the Apollo lunar landings dramatically proved the skills and capabilities of our space team. And the cost of the entire decade-long project was less than this year's defense budget.

Space scientists are now talking about projects that dwarf in size, scope and potential all of our previous space experience and achievements: strings of solar-power satellites, each tens of miles long, circling the Earth and supplying it with clean, inexhaustible energy; miles-long orbiting habitats housing tens of thousands of people in comfortable, variable-gravity environments; mining the Moon and the asteroids; new discoveries, techniques, industries.

The space program is bought and paid for by our tax dollars; it doesn't belong to the government, it belongs to the taxpayers. We have a say in its goals and direction.

Now is the time to stand up and let our voices be heard; to educate each other and our elected officials. Near-Earth space development must logically be mankind's next 'giant step.' As we learn how to leave the Earth and survive, and prosper, we shall be further along the path of our ultimate destiny—to live among the stars. Only a failure of vision can make this an impossible dream.

Howard Zimmerman/Editor

FUTURE #3

Next issue FUTURE presents an interview with Boris Vallejo, one of the leading illustrators in the field of fantasy, plus a full-color portfolio of his incredible work. And we'll have a report on the current state of our space exploration program and NASA's plans for the future; an interview with top SF author Larry Niven; TV and film news, new discoveries and inventions and pages of fantastic photos and surprise features!

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